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THE

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EDITED BY
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COLUMBUS, OHIO

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THE DENTAL SUMMARY

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REGULAR CONTRIBUTIONS

STANDARDIZED PROSTHETIC PROCEDURE*

BY ELBERT BRITTEN OWEN, D.D.S., ST. LOUIS, MO.
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IT MAY BE STATED, and no proof will be necessary to substantiate the fact, that many teeth are being extracted today that only a few years ago were considered favorable for treating. It perhaps would be possible to enumerate various reasons for this, such as better diagnosis on the part of the dentist, the ability to accurately interpret radiographs, etc., but those are not the reasons for the condition that I wish to discuss. It is the end product and the methods of attaining same that I came here to talk about.

---

*Clinical lecture before the Golden Jubilee Meeting of Tennessee State Dental Association, Memphis, June 19-22, 1917.

These teeth that are being extracted today will be restored, and for the most part will be restored with removable appliances such as full dentures, partial dentures and removable bridge work.

Other branches of dentistry have made great strides of progress by a thorough comprehension of certain underlying principles and then standardizing the technic. For example, Dr. Black uncovered the etiology of caries, then standardized the technic of cavity preparation to prevent recurrence of caries.

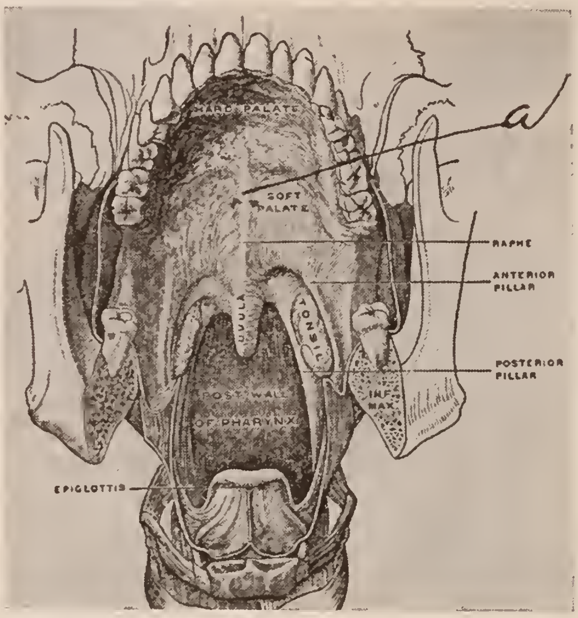

Figure 1—Showing three divisions of palate. Two dots (a) represent posterior margin of denture. (Luschka.)

Certain theories in denture retention must be understood, then definite procedures towards securing retention may be followed out.

Now let us discuss the true principle of retention of full dentures, which is adhesion by contact, sometimes called capillary, sometimes called molecular, attraction, but which is simply the attraction one body has for another when they are brought into absolute contact with each other.

Atmospheric pressure, contrary to the opinion of many, is only a negligible factor in the retention of dentures, it being dependent upon a vacuum, or near-vacuum, under the plate. So long as this space remains under the plate atmospheric pressure has some bearing on the retention, depending upon the degree of vacuity obtained, fifteen pounds of pressure to the square inch being the weight of a column of air on a surface from under which all air has been excluded. But the vacuum space cannot be permanent unless it is placed over a hard, unyielding area in which case it acts as a relief; otherwise the space is soon filled in with the yielding tissue and the influence of atmospheric pressure is lost, leaving the denture to be retained by the true principle, adhesion by contact.

The principle of physics known as adhesion by contact is best illustrated by taking two pieces of glass, moistening them and bringing them together. We find when we try to pull them apart at right angles there is considerable resistance, the film of moisture acting as it does in the mouth, to bring the two bodies into absolute contact, or as near absolute contact as it is physically possible to bring them, and the thinner the film of moisture the stronger the adhesion; therefore it is obvious that the closest possible adaptation of the solid bodies must be obtained. Now we will presume, for the sake of illustration, that the two pieces of glass mentioned are two inches square, and we find that they resist separation to a certain extent. If we took two other pieces four inches square we would have quadrupled our square area and, consequently, increased our adhesion proportionately. We, therefore, arrive at one conclusion: that if we secure the closest possible adaptation of our denture so that the film of moisture in the mouth may bring about absolute contact between the denture and mucous membrane, we know we will get adhesion. Also, if we increase the square area of our denture, within certain limits, of course, our adhesion will be increased proportionately. There you have, in condensed form, the correct theory of denture retention, which, when followed out with certain standardized technic, is as practical as any other theory in dentistry.

The principle of extending a denture, in all directions, to facilitate retention is called by Dr. Wilson "extension for retention." So far as the writer knows he coined the phrase and has been largely instrumental in rendering it so valuable and practical in denture construction.

To facilitate retention, a denture may be extended:

First: Posteriorly.

Second: Peripherally.

POSTERIORLY

The palate consists of three separate and distinct areas: (1) That which is supported by bony structures, known as the hard palate; (2) the anterior part of the soft palate, which is immovable or non-vibrating; (3) the posterior part of the soft palate, which is movable or vibrating.

A denture must not be terminated upon the hard palate since there is not enough valve action between the tissue and the margin of the denture to allow biting power on any of the teeth, particularly the anterior teeth.

We must not throw the margin of the denture very much, if any, on the vibrating soft palate, as this movable structure may dislodge the denture, likely will cause nausea and will invariably affect the speech, causing a peculiar "mushiness."

There remains, then, but one area in which we may place the posterior margin, and that is in the non-vibrating area of the soft palate.

In *Fig. 1* we have a diagram of the mouth open, showing the three divisions of the palate. The two dots (a) represent, when seen in the mouth, two little depressions, varying in size from a pin point to a pin head, and are located one on each side of the median line. These depressions are very distinct and there need be no doubt of their identity in nine cases out of ten. Their significance to us lies in the fact that they invariably indicate the division between the vibrating and non-vibrating soft palates, which fact may be proven to anyone's satisfaction by having the patient open the mouth wide and with the eye fixed on this area of the palate, have patient repeat some word or syllable which will bring into action the soft palate, such as "ah."

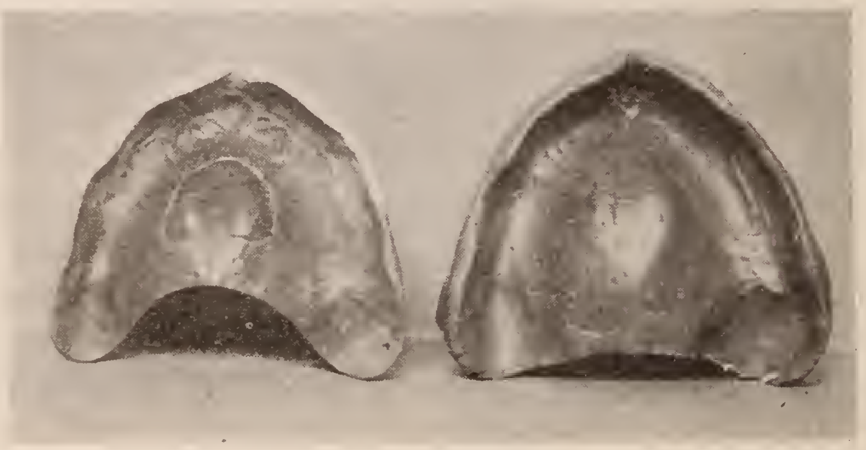

Figure 2—Two dentures for same mouth; one too short, the other proper length.

These little landmarks (I don't know the name of them) mark very definitely the posterior termination of your denture. If you go beyond that you will get onto the vibrating area, and if you come very far anteriorly to them you will reach the hard palate. Hence we arrive at one very definite fact: The posterior margin of our denture comes well around the tuberosities and strikes across the palate, passing through or just posterior to the palatal depressions. (*Fig. 2.*)

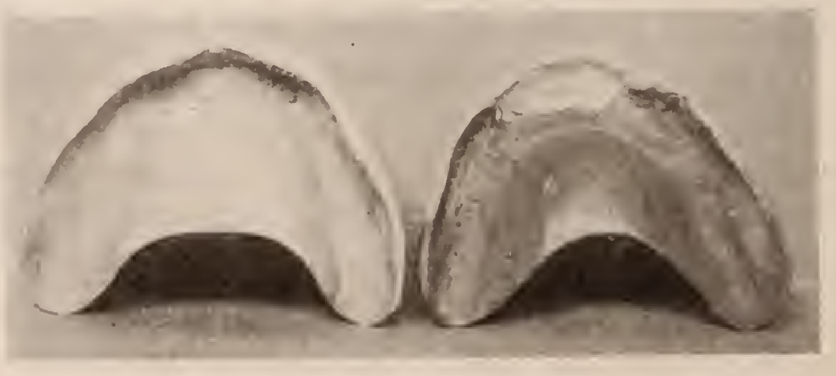

Figure 3—Two dentures, both of which are too short.

Fig. 3 shows dentures, both of which are too short and can never have more than a very moderate adhesion. They will offer very little or no resistance to force applied to the anterior teeth. Establish the length of the denture when it is made and do not trim it off if the patient should return and tell you it is too long. You will create greater confidence in your patient by telling her that the length is established by scientific means and it must be worn that way for best results.

PERIPHERAL EXTENSION

Peripheral extension is of double advantage; in addition to the greater square area afforded to develop adhesion, we have also the advantage of broadened, thickened margins which procure a better valve action with the tissues, preventing the ingress of air and weakening retention. This extension is usually practicable from the attachment of the buccinator muscle on each side, posteriorly to the angle of the tuberosities. Very much extension in the anterior part of the mouth usually is not permissible owing to the production of too much contour.

The practicability of this procedure is dependent upon the displacement of structures during the process of taking the impression; or rather, I should say, the lack of such displacement. A finished impression taken with a material which will offer great resistance to the tissues, such as modeling compound or thick and partially-crystallized plaster, in all probability will not permit of pronounced extension, since such an impression (*Fig. 4*) has distended the tissues far beyond normal and displaced all structures to such an extent that should a denture be constructed from this impression and inserted, the tendency of the tissues to resume their normal position would be a severe strain on the

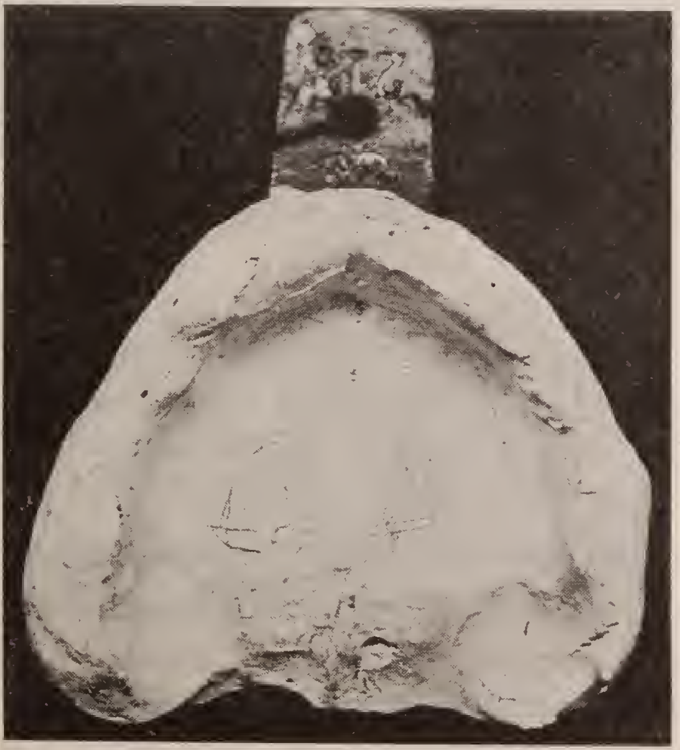

Figure 4—Plaster impression taken in the ordinary way, which has distended the tissues beyond normal and displaced all peripheral structures.

retention instead of producing a beneficial result; also there will be severe irritation to the peripheral tissues from the margin of the denture, even though the margin be thick. If, however, this impression should be taken with a material offering only a small degree of resistance to the tissues, such as thin plaster, allowing us to secure an impression of the tissues in their normal position, so that the impression material flowing over the sides of the tray may be formed by the tissues which have not been pushed out of position by strong force and a resistive material, then and only then is it practicable to extend a base-plate beyond that which is ordinarily seen. (*Fig. 5.*)

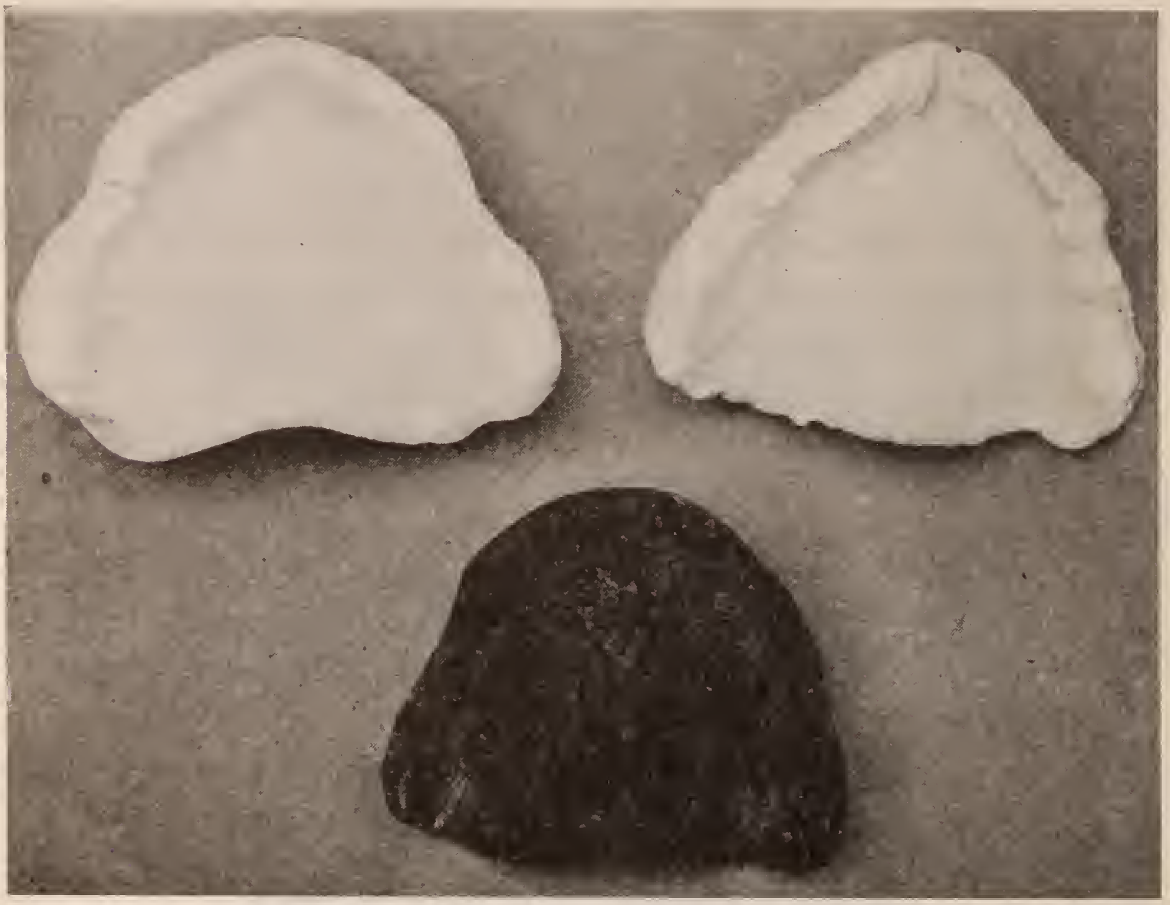

Figure 5—Upper tray of black modeling compound, and finished impressions for two cases.

IMPRESSION METHODS AND MATERIALS

It is not my intention to enter into the discussion of impression materials in general, but only those which are used in the methods which I advocate and use, modeling compound and plaster of Paris. And it should here be stated that the finished impression always is in plaster.

In this connection I would like to say that personally I have the greatest regard for those operators who use only compound for their impressions. I have seen their results in many cases and know them to be satisfactory, and to the champion of closed-mouth modeling compound impressions, Mr. Supplee, I am indebted for many valuable points in retention and denture construction. But the same results, and often better, secured with modeling compound at the expense of great skill and much time, may be secured with the proper manipulation of plaster in much less time and with ordinary skill.

HALL METHODS

Dr. Hall, now of Chicago, tells us that in the midst of his enthusiasm over modeling compound he was convinced that plaster was the only plausible material for impressions. So his experiments in the manipulation of plaster led to a system or technic known as the "Hall method," which technic is vastly different from any hitherto offered to the profession. The principle of this method is, as I stated before, the absence of tissue displacement in the finished impression together with peripheral and palatal extension. Dr. Hall's technic has been described many times and on many occasions, a very complete description of same being found in Wilson's "Dental Prosthetics," last edition.

However, every operator has his own modifications of every technic he endeavors to follow out, and it would be well to understand that any technic I may outline may be somewhat different from Dr. Hall's, and is merely my own interpretation and application of the Hall ideas.

INDIVIDUAL TRAY

This is made with modeling compound, using a stock tray suited for the mouth, and either Detroit compound or the S. S. W. black impression tray compound, which is harder and stronger than the Detroit product. The compound should be used rather soft and not much attention need be given to muscle trimming or displacement of tissues in making the tray; only, of course, excess of material, causing too much facial contour, should be trimmed off. (*Fig. 5.*)

This tray may be etched or scratched upon the palatal surface; however, this is not at all necessary. If the ridge is prominent, forming peripheral undercuts, these would better be eliminated in the tray, that the plaster may break away in these regions if necessary to facilitate removal of the impression. In making the tray, and while the compound is in the mouth, massage the material against the posterior part of the palate in order to bring about pressure of the tray in this region.

THE IMPRESSION

The tray having been made we are ready for the first step of the impression. A thin mix of plaster (ordinary impression plaster) is made by taking an excess of water in the plaster bowl, accelerated with sodium chlorid or potassium sulphate, and the plaster sifted in with a small sifter. The plaster passes through the water and settles to the bottom of the bowl. When, according to your judgment, enough plaster has been sifted in for the impression, decant the excess water and the plaster in the bottom of the bowl will need the spatula passed through it only two or three times to form a uniform thin mix. This thin plaster is poured into the tray until it is running over to get the periphery well covered; then the excess is poured out, as it is not necessary to put such an excess of plaster in the mouth since the tray practically fits the mouth. The tray with the small amount of thin plaster is now placed in the mouth and with a slight rotary motion, slowly and gradually worked to its seat. The tray should be held there with the finger, as it will in many instances become displaced if left for the patient to retain. Many operators use a thicker mix of cast plaster and do not work the impression up entirely to place, but this procedure deprives us of one advantage which goes a long way towards making the impression a success, viz., compression of the posterior part of the palate. Unless the plaster in this region has the support of the tray to hold it in position, the more or less spasmodic action of the vibrating soft palate will work it down and prevent pressing contact of the plate, a condition which renders the plate a failure.

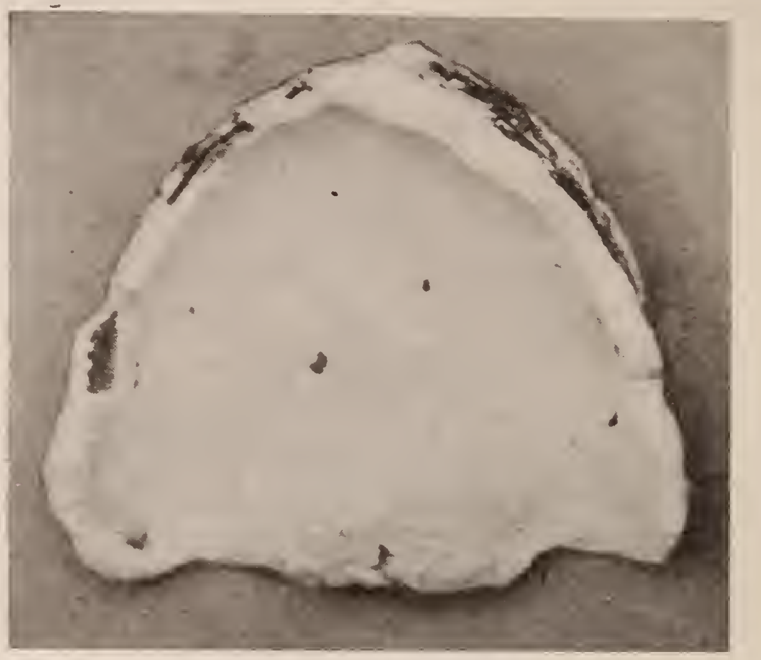

Figure 6—Impression after first attempt with plaster, showing imperfect results.

When removed from the mouth after the first attempt with plaster, the impression will show in many places on the periphery that the tissues were drawn taut across the margin of the tray, displacing the plaster and exposing the tray. This indicates that the tray displaced the tissues too much in those regions and should be trimmed off so the same condition will not result after the second attempt. (*Fig. 6.*)

The palate may appear thin and flaky, which indicates that pressure was greater in some places than others and displaced the plaster accordingly. However, these places do not have to be trimmed or scraped, as that will be taken care of in the next step.

After the excessive peripheral extension is trimmed off we are ready for the next step. The first impression is soaked in water so a second mix will adhere. The second mix, made just as the first, is poured into the impression, filling same, and pouring off most of excess, is carried to place just as we did the first time. Always make the mix of plaster just as I have described and you always will get the same smooth, uniform mix, practically of the same consistency every time you mix it. In this way you will find that you will develop greater skill in this delicate technic by having your conditions always the same.

In trying to remove these impressions you will find that it is a very difficult task. To accomplish this place the forefinger in the palatal region and the thumb above the impression in the cuspid region on left side, and press in on the tissue above the impression. This will loosen the impression and permit it to be removed easily.

When removed from the mouth the second time, the impression should show regular and uniform reproduction of the area we wish to cover with the denture. The plaster should not be displaced exposing the compound on the margins; if it does there is still too much displacement of tissues and the process should be repeated. With a little practice and ordinary care, however, the second attempt with the plaster gives satisfactory results. And we are quite sure that we have the posterior palatal compression, since in each effort we had the soft plaster in small quantity supported by a firm surface. (*Fig. 5.*)

When an impression is taken this way it can be seen clearly that as much peripheral extension may be produced in the denture as we have in the impression, facial contour being your only limit. And I dare say that if proper care is used in not crowding the space where the ramus of the mandible passes the tuberosities, there will be absolutely no trimming to do on the margins of the denture.

THE FULL LOWER PROBLEM

The same principle that applies to the retention of upper dentures applies even more so to the lower. The average lower denture that is put in the mouth (*Fig. 7*) does not rest upon enough square area of the tissues to afford a solid foundation for the pressure to be applied in the mastication of food, hence the idea that only a few pounds' pressure can be applied upon artificial dentures. Neither is there enough square area covered in the ordinary denture to develop adhesion to the extent that it will be a factor in retaining the denture, consequently it floats around in the mouth like a toy boat.

If we take an ordinary impression tray, fill it with thick plaster, in many instances partially set before it goes in the mouth, force it to position with heavy pressure, carrying every structure with it stretched to an extremely abnormal position, then it stands to reason we can hope for nothing better than the above results, as it would be impossible to extend the periphery of the denture over much surface with an impression of this sort. If we did, one of two things must result: severe irritation to the tissues or displacement of the denture.

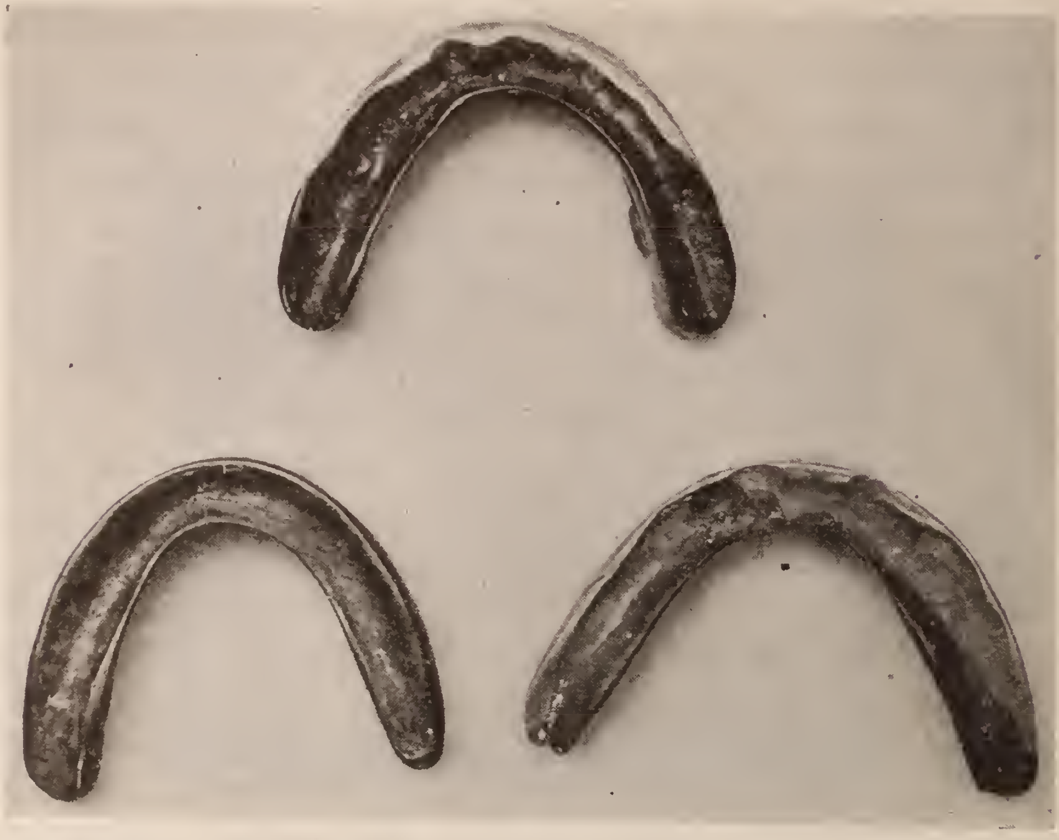

Figure 7—Full lower dentures of ordinary type, which do not cover sufficient surface to afford a substantial base for the forces of mastication.

I can state as a positive fact, however, and have clinical experience to back it up, that impressions may be taken from which we can make dentures covering a large area of the tissues, and that will be both serviceable and comfortable. And such a denture will have a base large enough to distribute the applied force over sufficient area to double or treble the biting or crushing power of the dentures. These dentures in most instances also develop a surprising amount of adhesion which is a source of great satisfaction to the patient as well as the operator. *Fig. 8* shows two dentures, both of which are being worn comfortably,

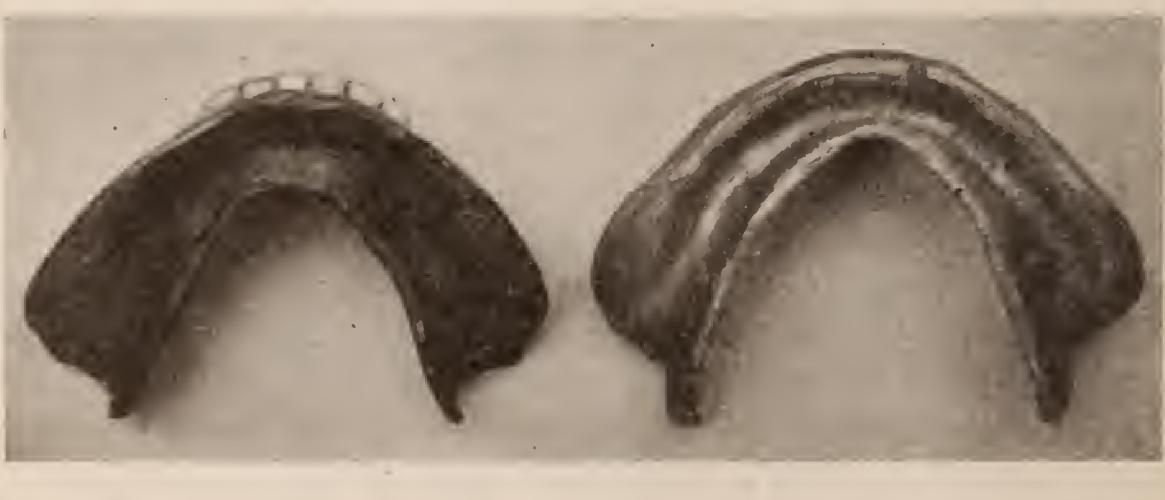

Figure 8—Two extended lower dentures, being worn at the present time, which have good adhesion and afford a large area for the applied forces of mastication.

will endure a great crushing force, and no biting leverage will displace them.

This result is dependent entirely upon an impression of the tissues in as nearly their normal position as it is possible to get them, or the lack of displacement or distortion of these tissues.

The ideas of Dr. Hall are especially applicable in these difficult full lower problems, more so even than in full uppers, since a lower impression in modeling compound from which a serviceable denture may be made is a very difficult proposition.

The technic of the lower impression consists in making the impression tray of hard modeling compound, using a stock tray as a means of carrying the compound to the mouth. Dr. Campbell uses a stiff wire in the bottom of the metal tray before introducing the compound, to prevent fracture of the compound tray after its removal from the metal tray; a very good idea.

The plaster used for this impression should be rather slow setting, allowing time for slow adjustment. I believe Dr. Hall now uses cast plaster, somewhat accelerated with potassium sulphate.

The compound tray is filled full of plaster, and operator occupying a position in front of patient or nearly so, inserts tray and plaster, releasing same immediately. The cheeks are distended on each side with the thumb and finger, then released to go back to normal position. The tongue may be raised, but immediately lowered. Then a very light guiding pressure is applied on the tray, but not enough to force it home. The soft plaster will run and spread over the mouth of its own accord, without pressure back of it, especially towards the buccal, and if technic has been carried out carefully, almost the same area as covered by the impression may be covered with the denture. This

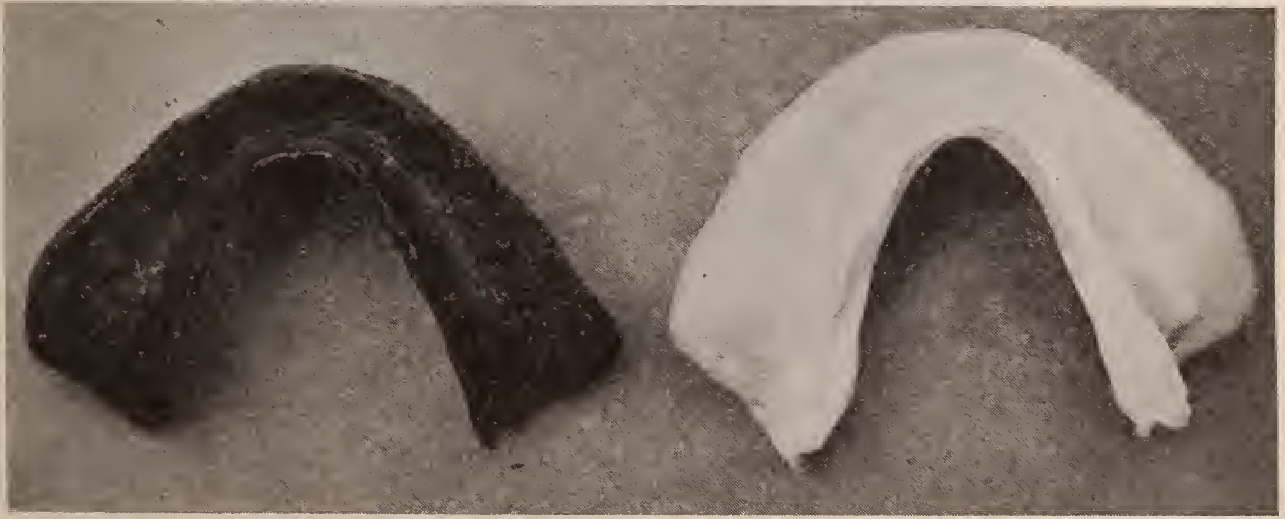

Figure 9—Full lower tray of compound, and finished impression showing marked extension.

will develop a surprising suction in most instances which can be endured, but in all cases will give a firm and satisfactory stationary base. (*Fig. 9.*)

THE CAST

After employing the time, skill and care necessary to produce a good impression, don't spoil this impression by using plaster of Paris for the cast. I'm not condemning plaster too severely, for many good dentures have been made over it, but knowing its properties of expansion and compressibility as we do, why take chances with it when such materials as Spence plaster and Weinstein's artificial stone are to be had?

Technic of manipulating these materials is too well known for discussion here. The writer personally prefers Spence plaster, which must be manipulated and jolted into the impression for two or three minutes in order to give a smooth cast. This jolting requires that some sort of a barrier be built around the impression to confine the cast material. This barrier serves also to preserve the contour of the impression in the cast, which is necessary if we are going to extend the denture accordingly. *Fig. 10* shows an impression with a barrier of pink wax prepared for the cast material.

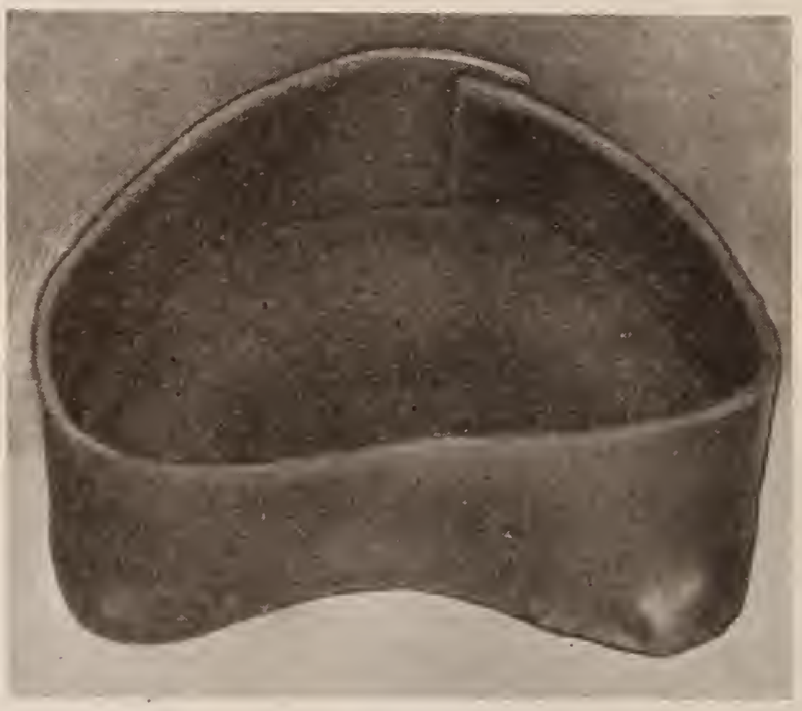

Figure 10—Upper impression with barrier of pink wax to confine cast material during jolting process.

335 Frisco Bldg.

> *The great highroad of human welfare lies along the old highway of steadfast well-doing; and they who are the most persistent, and work in the truest spirit, will invariably be the most successful; success treads on the heels of every right effort.* —S. SMILES

FRACTURES AND DISLOCATIONS OF THE JAWS*

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INTRODUCTION

IN LOOKING OVER the literature, we find that the oldest documents which are in existence at the present time relating to the practice of medicine and surgery are the various treatises contained in the collection which bears the name of Hippocrates.

Hippocrates (460-367 B.C.), the celebrated Greek physician, discusses at some length fractures and dislocations of the jaws. Many of his arguments in the treatment of this class of human ills are of such excellence that it always has been a question which has excited curiosity by what steps the treatment had attained to such perfection at so early a period.

Indeed, the principles laid down by Hippocrates over two thousand years ago in this work are so sane that many of them can be followed successfully today. His extensive practice and, no doubt, his great familiarity with the accidents occurring at the public games of his country, furnished him with ample opportunities of becoming acquainted with fractures and dislocations as his treatises on this subject abundantly testify. In fact, until within comparatively recent years, the plan of treatment of such cases was not at all to be compared with his skillful mode of adjusting fractured bones and of securing them by means of waxed bandages. Not only was Hippocrates skillful in the treatment of these conditions, but his methods were based on a knowledge of anatomy that seems almost incredible when we consider the state of knowledge of the people twenty-four centuries ago.

The writer believes that it will be of some interest in the history of fractures and dislocations to insert here abstracts of some of the early teachings of the great Greek physician.

He says in part: "The jaw bone, in few cases, is completely dislocated, for the zygomatic process formed from the upper jaw bone (*molar?*) and the bone behind the ear (*temporal?*) shuts up the heads of the under jaw, being above this one (*condyloid process?*). Of these extremities of the lower jaw, the one from its length, is not much exposed to accidents, while the other (*the coronoid?*) is more prominent than the zygoma, and from both these heads nervous tendons (*ligaments?*) arise, with which the muscles called temporal and masseter are

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connected; they have these names from their action and connections, for in eating, speaking and the other functional uses of the mouth, the upper jaw is at rest, as being connected with the head by synarthrosis, and not by diathrosis; but the lower jaw has motion, for it is connected with the upper jaw and the head by enarthrosis. Wherefore, in convulsions and tetanus the first symptom manifested is rigidity of the lower jaw. These are the reasons why complete dislocation does not readily take place, and this is another reason, because there is seldom a necessity for swallowing so large pieces of food as would make a man gape more than he easily can open his mouth, and dislocation cannot take place in any other positions than in great gaping, by which the jaw is displaced to either side.

"This circumstance, however, contributes to dislocation, then, of nerves (here Hippocrates probably means ligaments) and muscles around joints or connected with joints, such as frequently are moved in using the member are the most yielding to extension, in the same manner as well-dressed hides yield the most. With regard, then, to the matter on hand, the jaw bone is rarely dislocated, but frequently is slackened (partially displaced) in gaping, in the same manner as many other derangements of muscles and tendons arise."[1]

While the language Hippocrates uses in his descriptions is not as concise and consecutive as it might be, yet when we consider the time and conditions under which it was written we must refrain from making any criticisms. His description of the symptoms of dislocation of the jaw is worthy of more modern ages:

"Dislocation is particularly recognized by these symptoms: the lower jaw protrudes forward, there is displacement to the opposite side, the coronoid process appears more prominent than natural on the upper jaw, and the patient cannot shut his lower jaw but with difficulty. The mode of reduction which will apply in such cases is obvious: one person must secure the patient's head and another taking hold of the lower jaw with his fingers within and without at the chin, while the patient gapes as much as he can, first moves the lower jaw about for a time, pushing it to this side and that with the hand, and directing the patient himself to relax the jaw, to move it about, and yield as much as possible; then all of a sudden the operator must open the mouth while he attends at the same time to three positions: *First*, for the lower jaw is to be moved from the place to which it is dislocated to its natural position; *second*, it is to be pushed backwards, and *third*, along with these the jaws are to be brought together and kept shut. This is the method of reduction, and it cannot be performed in any other way."

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[1] Galen, in his Commentary on the passage, explains it as applying to displacement of the muscles. It would seem to be the species of incomplete displacement described by Sir Astley Cooper.

This last statement is dogmatic, but stated in Hippocrates' time, it can be overlooked, for he was the only person at that time who could speak upon any subject in medicine with any degree of authority.

Further he says: "A short treatment suffices; a waxed compress is to be laid on and bound with a loose bandage. It is safer to operate with the patient laid on his back and his head supported on a leather cushion well filled, so that it may yield as little as possible; but some person must hold the patient's head.

"When the jaw is dislocated on both sides, the treatment is the same. The patients are less able to shut the mouth than in the former variety, and the jaw protrudes farther in this case, but is not distorted; the absence of distortion may be recognized by comparing the corresponding rows of the teeth in the upper and lower jaws. In such cases reduction must be performed as quickly as possible. The method of reduction has been described above.

"If not reduced, the patient's life will be in danger from continual fevers, coma attended with stupor (for these muscles when distorted and stretched preternaturally induce coma), and there is usually diarrhœa attended with bilious, unmixed and scanty dejections; and the vomitings, if any, consist of pure bile, and the patients commonly die on the tenth day."

So thorough was Hippocrates' descriptions of dislocation of the lower jaw that it was copied by all the subsequent authorities in ancient times.

His discussions on "Fractures of the Jaws" are equally interesting. Many of these he describes as occurring among the ancient athletes and gladiators. From his description it can be seen that he had large experience in the treatment of fractures of all kinds, and his observations and findings are worthy of reproduction here.

"In fracture of the lower jaw, when the bone is not fairly broken across and is still partially retained but displaced, it should be adjusted by introducing the finger at the side of the tongue and making suitable counterpressure on the outside; and if the teeth at the wound be distorted and loosened, when the bone is adjusted, they should be connected together, not only two but more of them, with a gold thread if possible, but otherwise with a linen thread, until the bone is consolidated and then the part is to be dressed with cerate, a few compresses and a few bandages, which should not be very tight, but rather loose. For it should be well known that in fracture of the jaw, dressing with bandages if properly performed is of little advantage, but occasions great mischief if improperly done. Frequent examinations should be made

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[2] Galen, in his Commentary, explains that our author means all this is to be done by the patient and not by the physician.

about the tongue and prolonged pressure should be applied with the fingers in order to rectify the displaced bone.[2]

"But if the bone is fairly broken across it is to be set in the manner now described. When adjusted the teeth are to be fastened together as formerly described, for this will contribute much towards keeping the parts at rest, especially if properly fastened, and the ends of the threads secured with knots. But it is not easy to describe exactly in writing the whole manipulation of the case; but the reader must figure the thing to himself from the description given. Then one must take a piece of Carthaginian leather; if the patient be a younger person it will be sufficient to use the outer skin, but if an adult, the whole thickness of the hide will be required. It is to be cut to the breadth of about three inches, or as much as will be required, and having smeared the jaw with a little gum (for thus it sticks more pleasantly), the end of the skin is to be fastened with glue near the fractured part of the jaw at a distance of an inch or a little more from the wound. This piece is to be applied below the jaw; but the thong should have a cut in it, in the direction of the chin, so that it may go over the sharp point of the chin. Another piece of thong like this or somewhat broader is to be glued to the upper part of the jaw at about the same distance from the wound as the other thong; this thong should be so cut as to encircle the ear. The thongs should be sharp-pointed at the part where they unite, and in gluing them the flesh of the thong should be turned to the patient's skin, for in this way it will be more tenacious. Then we must stretch this thong, but still more so the one at the chin, in order to prevent the fragments of the jaw from riding over each other, and the thongs are to be fastened at the vertex and then a bandage is to be bound round the forehead (*Fig. 1*) and a proper apparatus is to be put over all to prevent the bandages from being displaced. The patient should lie upon the sound side of the jaw, not resting upon the jaw but upon the head.

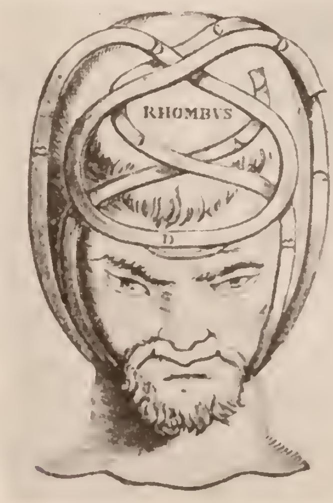

Fig. 1

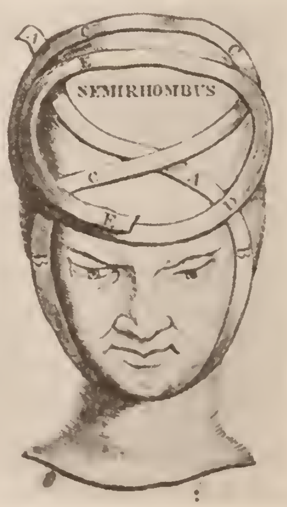

Fig. 2

He is to be kept on a spare diet for ten days and then nourished without delay. If there be no inflammation during the first days, the jaw is consolidated in twenty days, for callus quickly forms in this as in all the other porous bones, providing there be no sphacelus (exfoliations). Those physicians who have not judgment combined with dexterity, expose themselves in fractures of the jaws as in other cases, for they apply a variety of bandages to a jaw bone, sometimes properly and sometimes improperly. For all such bandaging of a fractured jaw bone has a tendency rather to derange the bones connected with the fracture than to bring them into their natural positions.

"But if the lower jaw be disjointed at its symphysis, it is the work which anyone can perform to rectify it; for the part which protrudes is to be pushed inwards by pressure with the fingers and the part which inclines inwards is to be forced outwards by pushing with the fingers from within. It is after having applied extension to separate the fragments that this is to be done, for they thus will be more easily restored to their natural position than if one should bring them together by using force. This is proper to be known as applying to all such cases. When you have set the parts, you must fasten the teeth on both sides to one another as formerly directed. The treatment is to be accomplished with cerate, a few compresses and bandages. This part in particular requires a short but complex bandaging, for it is nearly cylindrical, though not exactly so. (*Figs. 2 and 3*).

"If matters be properly adjusted and the patient kept quiet there will be speedy recovery and the teeth will be uninjured; but if not the recovery will be more protracted; the teeth will be distorted, will give trouble and become useless."

From Hippocrates' writings we can see that he had an extensive knowledge of the subject of fractures. His thoughts on bandaging alone are invaluable, and today if the same careful attention was given to bandaging the jaws in case of fracture, the indifferent results in many cases would not exist, but normal conditions would be more nearly established.

Aurelius Cornelius Celsus, a celebrated Roman physician and writer who lived about 25 A.D., in his writings, "De Medicina," states: "In the fractures of the other bones we frequently find one fragment detached from the other; in the mandible the fragments, although thrown out of place, always adhere one to another. Consequently, in this fracture we must first of all replace the fragments to their normal position, passing from the inside of the mouth and from the outside with the forefinger and thumb of both hands. Then in case of a transverse fracture (in which case an unevenness in the level of the teeth is produced), it is necessary, after having set the fragments in place, to tie together the two teeth nearest to the fracture with a silk thread (corresponding to our wiring today), or else, if these are loose, the next ones. After this one should apply externally to the part corresponding to the lesion a thick compress, dipped in wine and oil and sprinkled with flour and powdered olibanium. The compress is to be fixed in place by means of a bandage or a strip of soft leather with a longitudinal slit in the middle to embrace the chin, the two ends being tied together above the head."

Galen's Commentary is the next of the ancient works on fractures, and in fractures and dislocations of the jaws he reiterates and comments on much of Hippocrates' writings.

Avenzoar, a renowned Arabian physician, about the beginning of the twelfth century, in his writings, a compendium of practice "Al-Teisir," describes bandages for the fixation of the mandible. Apparently he depended entirely upon bandages to retain the fragments in position.

About this time a text-book of surgery was compiled and it is interesting to note some of the methods of treating fractures of the jaws. In this compilation we find the following on the treatment of fractures: "Take olibanium, mastic, colophen, glue, dragon blood; all this must be mixed with liquified resin and become ointment, which is placed over until complete consolidation, and everything must be fixed with the little lances in order that the portions be prevented from moving out of place. In the fracture of the mandible if the lower teeth are not in contact with the upper ones, the patient cannot masticate. Then the patient must be taken by the lower maxillæ and the parts moved here and there until the lower teeth will touch the upper ones."

In 1275 A.D., Wilhelm from Saliceto wrote the "Proxeos Totius Medicinæ," in which he speaks of the fractures of the jaws. In this he suggests a modification of the primitive methods of ligating the teeth. He suggests not only ligating and binding the teeth proximal to the fracture not only between themselves but also to the corresponding teeth of the maxillæ.

Ambroise Paré, "The Father of French Surgery," 1517-1590, wrote considerable on fractures and dislocations of the jaw. He says: "Then will be applied a leather ferrule such as from which the soles of a boot are made, which has been divided in the middle at the level of the chin, long and wide as the mandible. And then will be made a ligature two fingers wide and as long as necessary, cut at the ends, having only one finger wide, and at the level of the chin it will be parallelly cut, for the purpose of embracing and pressing better over the chin; and at the four extremities the shorter will be sewed at the top of the head to a night cap or calotte, and the other two longer ends will be kept transversely and sewed behind the same cap, everything done as skillfully as possible in order to hold well the fracture."

Bunon (1743), in his treatise on the diseases of the teeth, mentions two cases of fractures of the jaws which he succeeded in curing in a short time by the method of binding the teeth, the preceding attempts of experienced surgeons having failed entirely. One of these cases is particularly interesting. The seat of fracture corresponded with the bicuspid which, however, had become dislodged from the effect of the wound; the neighboring teeth were also loosened. Bunon filled the empty space left by the bicuspids with a piece of ivory provided with two holes; then by an ingenious crossing of threads passing from the second molar on one side to the second bicuspid on the other, very tightly tied, he formed one single block and succeeded in bringing about consolidation of the loosened teeth and the complete cure of the fracture, which was effected in less than a month. (Guerini from Brophy.)

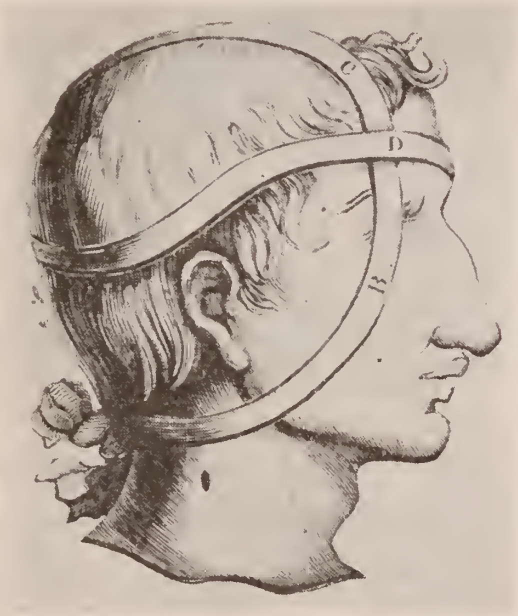

Fig. 3

The foregoing is given merely as a preface to the series of articles on fractures and dislocations of the jaws to show that long before the Christian Era considerable thought was given to this subject. The development of the treatment of fractures of the jaw has hardly kept pace with the treatment of fractures of other parts of the body, probably on account of comparative scarcity of the number of cases, but modern machinery and modern methods of travel are adding yearly to the increasing number of cases of fracture and dislocation of the jaws.

The greatest factor of all times in producing fractures of the jaws is the great European War. It is reported that in one hospital alone in Germany more than five hundred cases of fracture of the jaws were being treated at one time. New methods and new appliances are being introduced in the treatment of these war cases that are putting the treatment of fractures and dislocations on an entirely different basis.

(*To be continued.*)

ROOT-CANAL PROBLEMS AND MODERN METHODS OF TREATMENT*

BY I. LESTER FURNAS, D.D.S., INDIANAPOLIS, IND.

IS THERE A SUBJECT now prominent before the dental profession that has been so overworked in the way of essays and papers in the last few years? Is there a subject that interests us as dentists that has been more discussed, re-discussed and—cussed? Is there a subject upon which has been heaped more theories and ideas, both practical and impractical? Is there a subject that has caused us more worry and trouble? Is there a subject that we should give more attention to to fit us for our daily work? It is the opinion of the writer that there is not.

I fully realize that this subject has become more or less of a bore. But with our pulp-canal troubles daily increasing, instead of diminishing, I am convinced that the end is not yet, and our troubles of the present and the past can only be compared to the gentle breeze that precedes the hurricane.

It is interesting to look for a minute at the inception of this, our greatest trouble, and note the efforts that were made in early years to overcome it:

Dentistry in its various forms of application dates back to almost the beginning of time. The earliest history that we have, however, dealing directly with the subject, is a few lengthy prescriptions that are supposed to have originated about eight hundred years before Christ. The first reference to pulp-canal work came very much later, but writings show that it was a recognized fact that the enamel and dentin encased a pulp, many years before any attempt at scientific treatment was made.

This bit of intelligence was, no doubt, discovered by some inquisitive individual being anxious to *find out if possible* just what it was that caused the terrific pain that he had suffered, or possibly some less patient being, seeking revenge upon his tooth, following its extraction.

To try to enumerate all the early methods of treatment and their approximate dates here would be both impossible and impracticable. It is sufficient to say that they were many and, I dare say, that the results obtained were equally numerous. Their main value is only to serve as a foundation upon which to build a structure that, when finished, will stand square, level and plumb. And with the light of the

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*Read before the Indiana State Dental Society, 1917.

X-ray thrown upon our present-day "best efforts," it becomes wofully apparent that we are still adding our stones of experience to that foundation, and it will be for those who follow us to profit from our efforts and erect the building.

It is not my purpose in this paper to take up the therapeutic treatment of the dental pulp. That is a field unto itself. I will discuss, therefore, only methods and materials used in pulp-canal filling.

One of the first attempts at pulp-canal filling was practiced with the use of wooden points, or splinters, and described as *pulp knocking*, in 1853. The roof of the pulp chamber was first removed, and then with a quick blow from a mallet the wooden point or splinter was driven into the canal, painlessly of course! It would be useless for me to enlarge upon how utterly impossible it would be to properly fill canals by this procedure. Nevertheless, it was a stepping-stone. It was soon found that by baking these points to thoroughly dry them before using they would be much better, because after their insertion the moisture would cause them to expand, thereby better filling the canal. The next step was first to dry and then boil them in creosote, which you must admit was a step well taken in the right direction.

About this time the use of cotton as a canal filling was advocated. The pulp was exposed and removed, as well as crude instruments would permit, and cotton, saturated in various medicaments, was packed in the canal. This was hailed as the ideal because much less trouble apparently developed, as it served as a permanent treatment. Of course, many blind abscesses formed but never were discovered. There was developed however, enough trouble to show the practitioner of that day that other means must be devised to fill pulp canals. Men all over the world in the practice of dentistry were experimenting with various and sundry materials, endeavoring to adapt them to the purpose: lead, tin, gold, copper, silk, cement, hog bristles, and later amalgam all were tried earnestly under all conditions, but to no avail.

To determine who was the first to use a new material and when it was first used is impossible; but the most active period seems to have been from about 1845 to 1893. At about the latter date it became apparent that the percentage of failures was too large; therefore many of the leaders of that time began experimenting on various mummifying and digestive agents.

About 1865 gutta percha was first employed as a canal filling, and since its introduction it has been used and generally conceded to be the best known material for this work.

In summing up the success which was attained with the various methods, it is interesting to note that few failures are mentioned. Dr. J. Foster Flagg, in a paper before the New York State Dental Society, in October, 1850, describing his father's method of filling pulp canals with creosote and cotton, makes the statement that "they were all successful. He had no 'percentage' in such cases." Let us be charitable with Dr. Flagg for making this radical statement, and remember that Dr. Flagg did not have the service of Dr. Raper and his X-ray machine to help him gather statistics for his paper.

The failures that confronted these men were not due to lack of skill, for without doubt many of them developed a technic scarcely equalled by our best operators of today. But it was due largely to the crude materials they were trying to use and the lack of suitable instruments with which to work. The fact that the pulp canal was considered of minor importance insofar as the finished dental operation was concerned, no doubt played an important part regarding the percentage of failures.

One of the many causes of trouble experienced by the pioneers of pulp-canal work has lived *in an apparent state of health* until the present time, and that is the practice persisted in by some dentists even today of treating and filling pulp canals free of charge. Just so long as this abominable practice is continued pulp canals will cause trouble; and in this respect the profession of dentistry will be looked upon as an unreliable "trade," minus professional standing or dignity.

Another important reason for the failure of early pulp-canal work was that the canals could not be enlarged to permit proper filling. Thumb broaches and canal reamers could not be secured to perform this bit of the work so necessary to successful completion. It was not until December, 1893, that this great obstacle was finally overcome, when Dr. J. R. Callahan, of Cincinnati, presented his famous paper on "Sulphuric Acid for Opening Pulp Canals" before the Ohio State Dental Society. This was, up to that time, and has remained, the greatest step forward in the technic of pulp-canal filling.

The technic which he advocated at that time was adopted immediately and universally, and has remained practically unchanged, namely, the pumping of a fifty-per-cent. aqueous solution of sulphuric acid into canals by the use of broaches. At this time it seemed that the canal troubles were at an end. The gutta-percha point packed firmly into the enlarged canal solved the problem, and the devitalization of a tooth was a simple matter and of minor importance.

About this time a few men seeking a still easier method experimented with and placed upon the market various forms of paste preparations to take the place of the gutta-percha point. These pastes are on the market at the present time and can be secured at the dental depots. These pastes practically all rely upon strong antiseptic drugs which they contain to overcome present and prevent recurrent infection. The writer hesitates either to recommend or condemn such practice of pulp-canal filling from a standpoint of experience. Theoretically it is wrong. Practically, in the hands of a few, it may be fairly successful; but in the hands of all, pulp canals so filled will absorb body fluids at the root apex and the drugs contained in the preparation will lose their antiseptic properties. Does this not seem to be enough to warrant their discard? I have yet to see the first radiograph of pulp canals filled by this method that does not show a rarefied area of infection at the root-end to a greater or less degree.

For the period of a few years, approximately from 1895 to 1905, there was little or no advancement made in pulp-canal work, more attention being given to anesthetics, anelgesia and prosthetics. About the latter date Dr. Hunter, of London, England, advanced the idea that a large percentage of systemic infections have their origin in blind abscesses at the root-ends of teeth, due to faulty pulp-canal fillings.

And so it was that with one jolt at the hands of the physicians, the dental profession received a rude awakening. Almost over night we awoke to find accredited to our negligence a big percentage of all arthritis, neuritis, endocarditis, many of the so-called rheumatisms, various circulatory and intestinal disturbances, and many other body ailments that have remained a deep mystery to the medical profession through the ages past. The X-ray was introduced to show large areas of infection at imperfectly-filled and perfectly-filled root-ends. Cultures taken from these infected areas were made to grow the same type of pathogenic micro-organisms that seemed to cause the general systemic ailment. Upon removal by curettment of these necrotic areas, many remarkable recoveries were reported.

Much publicity was received and the laity, as well as the dental profession, began to exhibit the keenest concern regarding their "dead teeth." Almost immediately wholesale devitalization was changed to ultra-conservative pulp preservation. The need of immediate improvement in pulp-canal technic was evident in the extreme, and many of the master minds of the profession began a series of scientific experiments in an endeavor to improve our pulp-canal technic.

Dr. John P. Buckley advocated the use of pheno-sulphonic acid and formo-cresol as therapeutic agents, then pumping into the dehydrated canal eucalipta-percha or chloro-percha as a canal lubricant, and then the packing of gutta-percha points tightly into the canal. This method has been used very successfully by many men and can be classed as one of our best methods.

Dr. John R. Callahan, of Cincinnati, after much scientific research, presented to the profession a technic which, when mastered, will produce results almost beyond criticism. It consists of opening and enlarging the pulp canals with the aid of sulphuric acid and broaches. The acid is then neutralized and the canals thoroughly dehydrated. The canals are then flooded with a six-per-cent. solution of rosin in chloroform.

The chloroform acting as a vehicle, penetrates the dentinal tubuli, carrying with it the resin in solution. The chloroform then evaporates, leaving the resin which hermetically seals each and every dentinal tubuli. While the canal is still filled with an excess of the resinous solution, a gutta-percha point is selected as regards the proper size and introduced into the canal. This point is then worked with a pumping motion until it is partially dissolved in the chloroform-resin solution. That portion of the point which is in solution will then be forced into the finest canals branching out at the root apex and then, with additional points, the canal is filled. This method is at present being used by many of the leading men of the profession with excellent results.

The writer used it a great deal but was forced to abandon it because of the large number of sore teeth that resulted, many cases of soreness being so severe that it was necessary to resort to extraction. It is my firm belief, however, that this trouble was not due entirely to the method but to the faulty technic in its administration. The technic involved in this method is minutely exacting, but when carefully followed by a skillful operator the results are most gratifying.

Dr. R. Ottolengui, of New York City, has evolved a valuable technic for this work. It consists of carefully opening and enlarging the pulp canals and filling with gutta-percha points, after having treated the canal with a lubricant such as eucalipta-percha. The gutta-percha points are firmly seated in the canal by using a small mallet and canal plugger of the proper size. This method also can excite only words of commendation, as it produces results that are almost beyond criticism when carefully followed.

The method of canal filling which I have found to be the most satisfactory in my hands is a combination of the previous methods. I believe, for the man of average skill and ability, it will be found to be both practical and efficient. It is as follows:

Open the pulp chamber until the pulp canals are easily accessible and then proceed to enlarge them to the best possible advantage with a fifty-per-cent. solution of sulphuric acid. Neutralize this acid and thoroughly dehydrate. Fill the canals with Callahan's resin solution and pump same to the root apex with a fine, smooth broach; then dry with hot air. This hermetically seals the dentinal tubuli. Eucalipta-percha compound is then used as a canal lubricant. This compound, when cold, should be very heavy and stiff, or in a molding stage and not a flowing stage. This compound should be heated to a temperature no less than 200 degrees Fahrenheit in a water bath, at which temperature it will be found to be very soft and flow very readily. This hot eucalipta-percha compound is then pumped into the canals, using for this purpose a very fine, smooth broach. As soon as the operator is satisfied that the canal is filled to the end with this solution, then a small cylinder of gutta percha is introduced into the canal. The smooth broach is at once forced down along the side of this cylinder and room made for a second one, which is sent gently to its place alongside the first one. This is repeated until the small, smooth broach no longer can be forced into the canal to make room for additional cylinders of gutta percha. The canal then should be filled to approximately one to three millimeters of its mouth. A cylinder of larger dimensions is then inserted that will just about fill the mouth of the canal. This is pressed firmly in place with large canal pluggers and lastly given two or three light blows with a mallet to firmly seat the entire mass. This will give you a canal filling that by no means is proof against failures, nor is it above criticism, but the technic is easily mastered and can be put into thoroughly successful practice by any dentist. The time consumed by this method is but little if any more than that of the other technics and in my hands has been more successful.

There are many canals so small that only one cylinder can be crowded into them, and then again I have seen many where eight to ten cylinders placed side by side were required to fill them.

For this work I believe that the smallest size gutta-percha cylinders should be used in the place of the cones. The cone has a tendency to deceive the operator sometimes by filling the mouth of the canal before the rest of the canal has been packed full.

In many cases the radiograph will show that some of the eucalipta-percha compound or even the gutta-percha filling has been forced slightly beyond the apex of the tooth. I have seen many cases of this kind, but I have yet to see the first one that caused the slightest trouble permanently if the filling material was sterile.

There are a few general rules that must be observed in pulp-canal work that I have not mentioned, nor do I intend to elaborate upon them at any great length now, more than just to mention them.

I believe that it is absolutely essential that every means known to the medical or dental profession to guard against infection should be religiously adhered to. The rubber dam always, without fail, should be adjusted, and all the incorporated teeth sterilized with iodin or alcohol. The gutta-percha filling material to be used should be kept in iodin or some similar antiseptic and every care possible taken during their insertion.

Instruments and napkins, of course, should be as clean as it is possible to make them and no rule of sanitation should be overlooked.

Now, after we have taken every possible care and we have the pulp canals as perfectly filled as it is possible for us to do with our present knowledge, then we still have the chance of a hæmatogenous infection from the blood stream, immediately transforming our tooth from a sterile to an infected sequestrum. This means a blind abscess followed by a possible systemic infection. Hence, all our efforts have come to naught. The question, then, naturally arises: Shall we or shall we not attempt to devitalize teeth? I believe that it always will be necessary to practice devitalization, but if we are conscientious in our efforts and strive to give to our patients only the kind of dentistry that they should have, then I believe that we should follow up our pulp-canal fillings with repeated X-ray examinations and see if we get a development of infection at the root end. These examinations should be made at intervals of from one to three months following the filling of the canal.

Now, I well know the criticism that this statement will bring forth. It will be called foolish and impractical and many other things, but it is my honest opinion that the "new dentistry" will demand just such care and precision. To the man practicing in the small country town who says he never could think of such a thing in his practice, not to mention putting it into effect, I can only say that it must then be up to the new man who eventually will come to take his place to put it into practice.

We must give the pulp canal and its treatment its due amount of recognition. It is demanding it now, and we must listen to its call. I believe that there are many new developments to come soon in pulp-canal work. The ionization treatment is practically in its infancy, but results nothing short of marvelous are being obtained with it. Apicœctomy operations are now being performed daily and the results are most gratifying. New things are being developed constantly at the research institute of the National Dental Association by the best and most scientific men in our profession. The definite demand for a better pulp-canal technic is here and we must do our part towards meeting the emergency.

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DISCUSSION*

Dr. E. W. Ream, Crawfordsville, Ind.: This subject of root-canal filling is not only an active one in dentistry, but in the light of recent research efforts, one that should engage the serious thoughts and efforts of all members of the dental profession.

The medical journals, through investigations conducted by members of their own profession, with the use of the X-ray, are making statements that eighty-three per cent. of the teeth from which dentists have attempted to remove the nerve and fill the root canals show failure. In some dental magazines have appeared acknowledgment of seventy-five per cent. failures. The modern readings of the X-ray are revealing vastly more failures than had been expected.

I would like to show a few pictures. We have been interested in this subject for a number of years, and the subject as presented by the essayist and the discussion as given by Dr. Raper have been most interesting. I feel it would not be well to let it pass without notice. In the past number of years I have confined myself to the investi-

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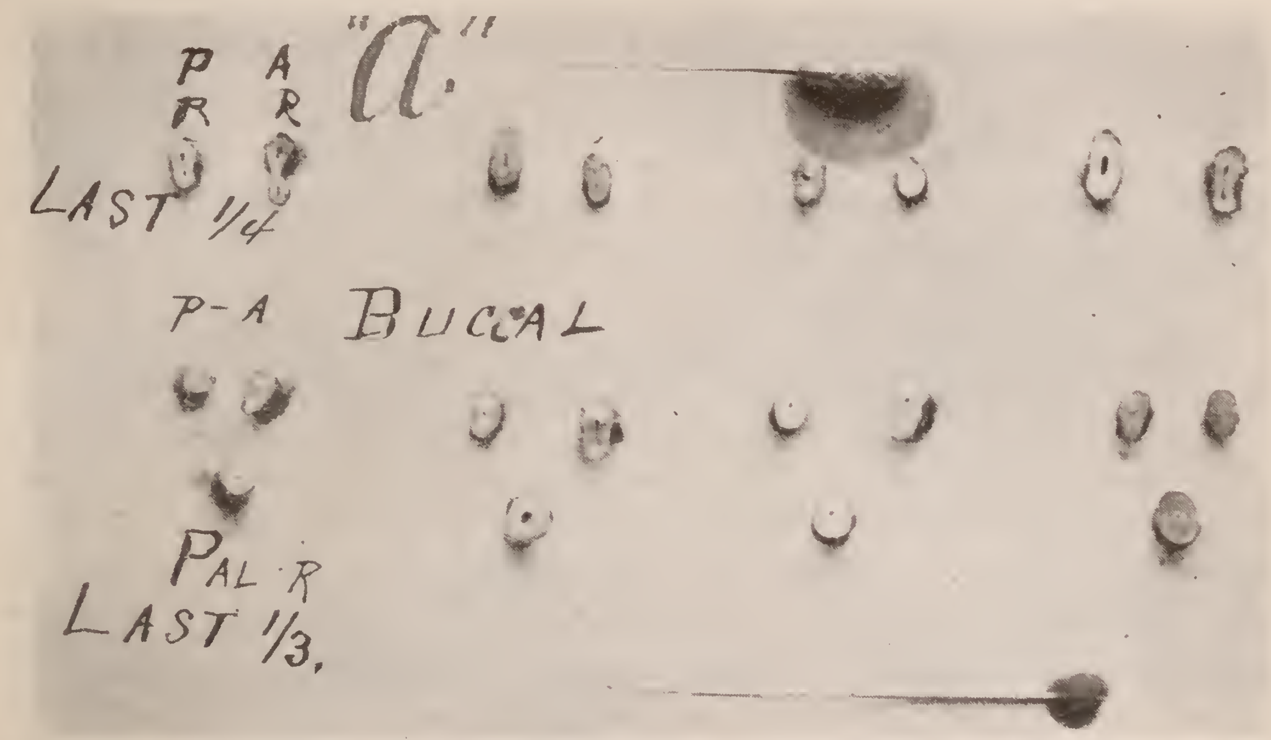
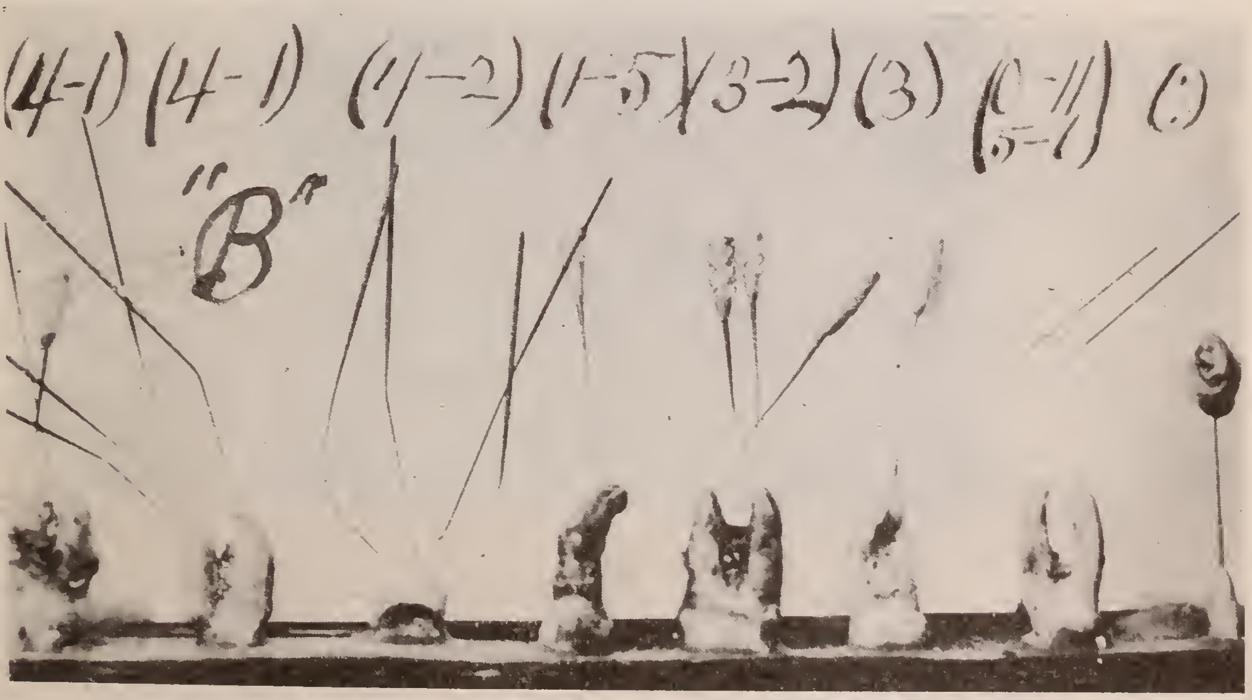
*On account of illness, Dr. Raper, who opened the discussion, has not been able to get his matter in shape for publication; hence we are obliged to omit his interesting discussion.—*Editor.*

gation of five hundred cases of extracted teeth by sawing off the last one-quarter and one-third of the roots, and thus began operating on the sawed-off part, attempting to prepare them for root-canal filling under the advantage of having the root out of the mouth, and no more than the pivotal or questionable part of the root to prepare. In the picture marked *A* we have in the upper row the roots of four lower back teeth, with the ends sawed off. The first of the two roots in each case is the posterior, while the second is the anterior root. The character of the root-canals as shown in the last one-quarter and one-third, as regards shape and size relative to the broach shown above, are explained by the picture, and suggests the difficulties encountered in the attempted preparation. The canal next to the tongue is always smaller than the one next to the cheek, which nearly always is true where there are two root canals in a lower root. The reverse is true in the upper molars, which are shown in this second row of the picture.





In filling these five hundred teeth thus prepared, I used the Callahan root-canal resin material, and with the advantages indicated I successfully filled the root canals of eighteen of two hundred and fifty lowers, and twenty-five of the two hundred and fifty uppers, which is close to the estimate made by the medical journals.

The picture marked *B* was prepared to show conditions that exist from the apical end of the root. The figures in the parenthesis above indicate the number of foramina. The number to the left indicates the number of foramina into which the smallest broach can be introduced and the one to the right the number into which it cannot be introduced. So the extreme one to the left has four foramina into which a broach can be introduced, and one into which it cannot. So each of these pictures speaks for itself. Notice the next to the last on the right: A lower molar with eleven foramina, *none* of which can be entered with the smallest broach; five in one root and six in the other. This condition is not common, there always being one or more into which a broach may be introduced. The last one to the right shows the undeveloped root of a lower bicuspid before the foramen or foramina were formed.

There is still another interesting thing about this picture to which attention has not been directed by various writers discussing this subject. The place on the root that some of these broaches enter and the angle they enter in relation to the main shaft of the root. Note the second tooth from the left in the picture. You see that one root has one foramen into which the broach passes, while the other root has three. On this root note that one broach enters the root below the end of root and not far from a right angle to shaft of root. This is true of nearly every tooth with multiple foramina. The fourth tooth from the left with only one foramen on the body of root into which a broach can be passed, while on the round end of the root, five into which a broach cannot be introduced. I am persuaded that multiple foramina are very much more common than has been supposed, and if you are of an investigating type of mind, a little effort will convince you that they are more common than authors have conceded, thus accounting at least for some of the failures in root-canal operations recorded.

Dr. Best speaks of the periapical tissue as being the most resistless tissue of the body as regards its resistence to infection. When a tooth finally is fully grown the root fully developed, this periapical tissue loses its profuse nerve and blood supply and becomes of a semi-cartilaginous character, acting as a buffer for the forces of biting and chewing. It is a tissue by character and nature peculiarly susceptible to the invasion of infection either directly from infectious materials remaining in a single or multiple foramina, or by bacteria carried by the blood and lymph streams into this tissue.

Dr. Furnas (closing): I put several things in this paper to provoke discussion, and I am rather disappointed that they were not taken hold of a little more. This paste infection at root ends; I know many men use this paste very successfully, and I wanted them to defend their side of this thing. The statement I made that these pastes would absorb body fluids was based on this experiment: I took a medicine dropper, heated it and drew it out into a tube with an opening about the size of a small root canal. I made a mixture of this pustulene (I used that for this experiment), and filled the inside of this tube. I stuck that in wax and inverted it in a solution of carbolfuchsine. I noticed how far this solution would penetrate and discolor the pustulene, and it would penetrate very readily, that is, in from thirty-six to forty-eight hours, and more as the time went on.

We enjoy ourselves only in our work, our doing; and our best doing is our best enjoyment.

—Jacobi

APIECTOMY*

BY EARL BROOKS, D.D.S., NOBLESVILLE, INDIANA

APIECTOMY is the act of cutting off the apex of a tooth-root. The nomenclature is very incomplete for this class of operations. Apiectomy, as far as it goes, is all right, but it stops too soon because in all such operations there is also a pyogenic membrane to remove and necrotic bone to curette. Resecting the root-end is another term that falls short of a complete term. Root amputation is entirely misleading; amputation of the apex would be much better. In this operation there is not always the necessity for cutting off a segment of the root, but in many cases merely a polishing of the apex is all that is necessary. The root must either be polished down or resected as far crownward as the peridental membrane is dead. Just how far crownward we can proceed and still have enough remaining root left to support the crown is a matter that takes considerable judgment. From one-third to one-half of the root resected is about the limit. This fact must be borne in mind that the closer we proceed to the gingival the less are the chances for the case to prove satisfactory. In no case should the apex be resected and recovery expected when a sinus leads from the apical region through the peridental membrane to the gingival margin.

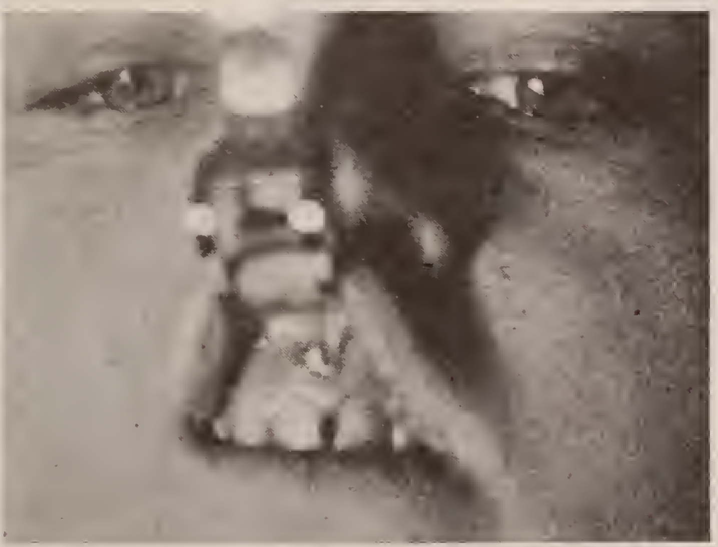


Fig. 1

What teeth this operation is indicated for is a question that there is a variance of opinion upon. It is not impossible to perform it upon any tooth, yet owing to inaccessibility the operation is contraindicated on the posteriors, both superior and inferior. The inferior anteriors are more accessible, but the difficulty of maintaining surgical cleanliness during the operation is a drawback in this location. The superior anterior ten are the ones that are the most ideal for the operation.

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*Given as an illustrated clinic before the Indiana State Dental Association, May 15, 16 and 17, 1917.

Fig. 1: This slide shows the patient as she presents. A microscopical examination of the gums above the centrals shows a small parulis above the right central quite close to the median line. This does not necessarily mean that there is an abscess on the right central; it may be associated with the left central or either lateral or even more distant still.

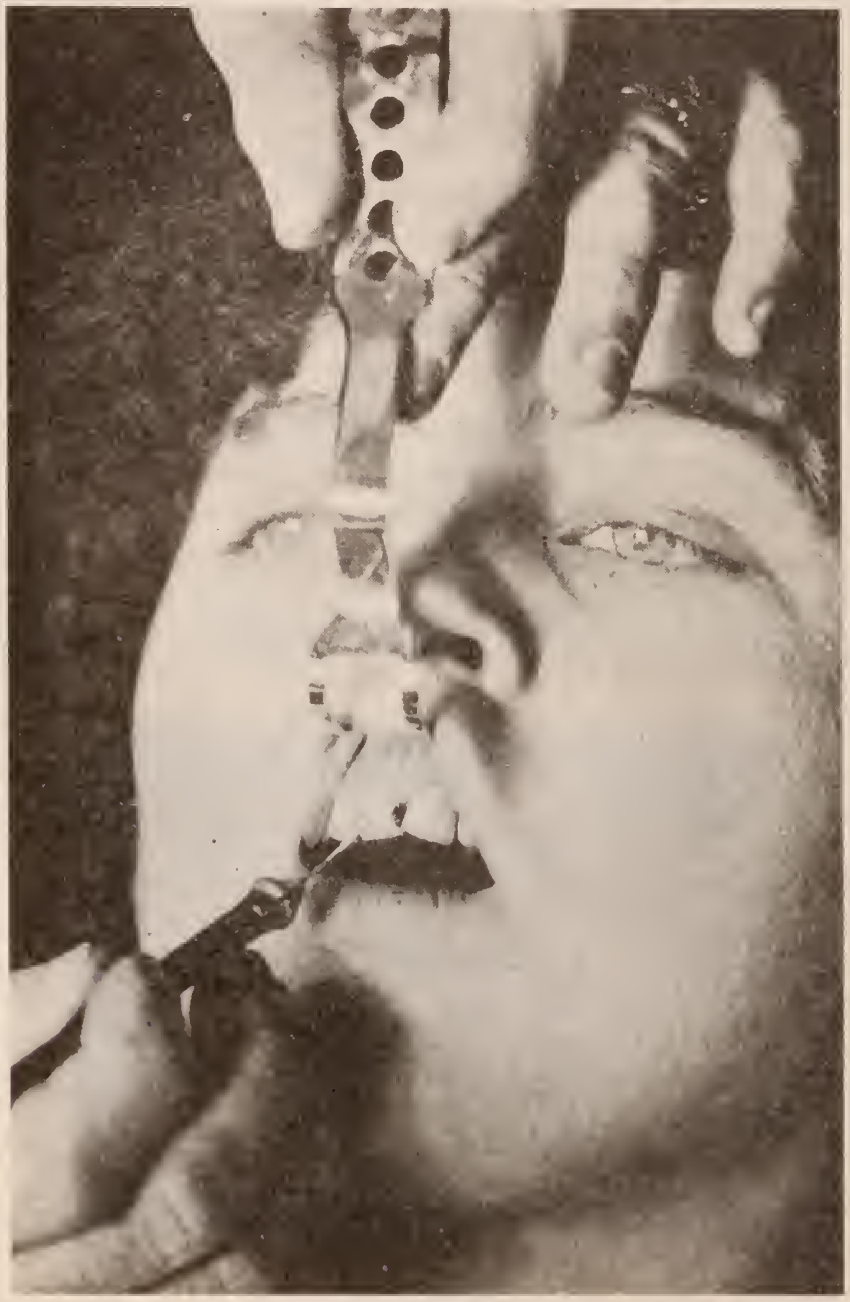

Fig. 2

Fig. 2: The teeth are tested with the Faradic current for vitality. the details of which are not pertinent to this clinic, but suffice it to say that both centrals were found to be non-vital.

Fig. 3: An X-ray picture is then made of the two centrals. The radiograph reveals the fact that the left central has a good root filling in it and the tissues surrounding the apex seem to be healthy. The

right central has an unfilled canal and a radio-lucent area in the apical tissues surrounding the apex.

History: About five years ago the right central was filled. A pulpitis developed and in due time the pulp died; acute abscess followed, which in a few days established a fistula and began discharging on the gum. It then passed into the chronic stage, but has recurred a number of times in sub-acute form. Since the first acute abscess the patient has suffered numerous attacks of rheumatism in the right shoulder and has frequent occurrence of "stiff neck."

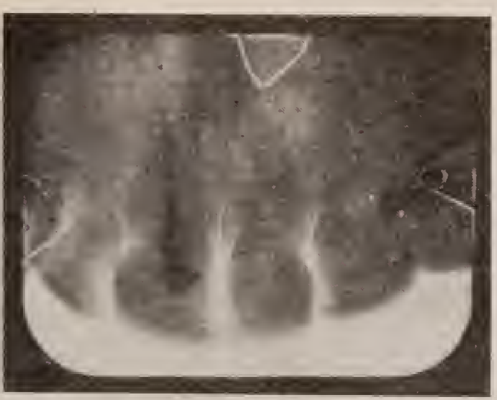

Fig. 3

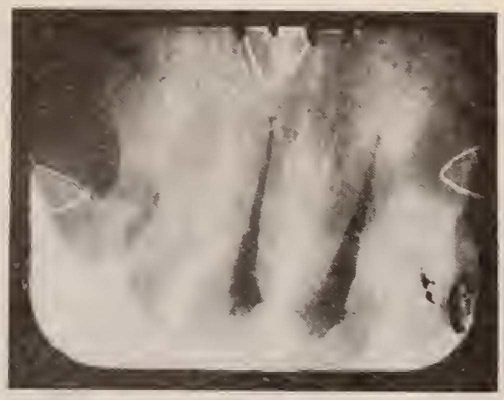

Fig. 4

The treatment in this case is beyond medication or even ionization. We have a necrosed apex and in all probabilities a granuloma, well organized. Surgical interference will have to be resorted to. Either exodontia and curetting or apiectomy and curetting should cure the case. The latter is preferable because it conserves the teeth and yet removes the sick and dead tissues and lets nature cure the case.

Fig. 4: The canal is opened from the cavity, cleansed, sterilized and filled. The cavity in the crown also is filled and the radiograph shows the canal filling. When the canal was first opened a culture was made on agar agar from the canal contents.

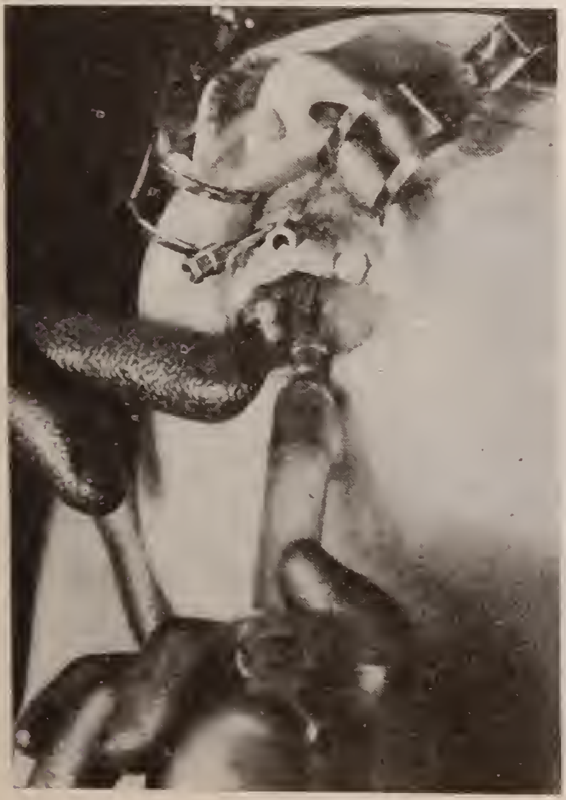

Fig. 5

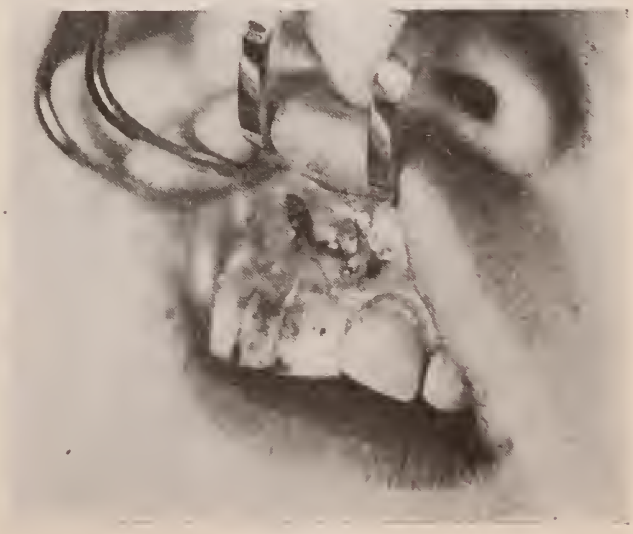

Fig. 6

Fig. 5: Infiltration anesthesia is generally the method of choice where it can be used, and in the superior anterior ten it can be used admirably. It not only produces perfect anesthesia but with the novocain-suprarenin solution, the latter drug controls the hemorrhage, which is a great convenience in this operation. The position of the two needles on the labial denotes the points of injection there and the photograph was taken during the lingual injection.

Fig. 6: The initial incision is made with a short, heavy knife, entirely through the mucous membrane, gum and periosteum. A crescentic incision with the points extending upward is the incision of choice.

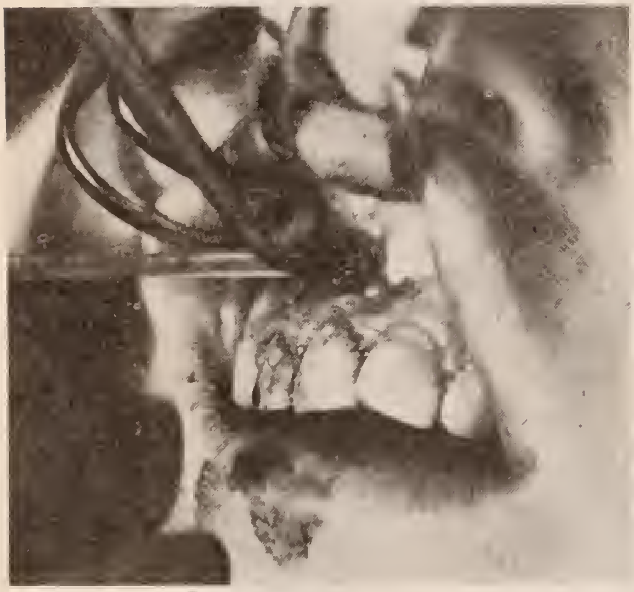

Fig. 7

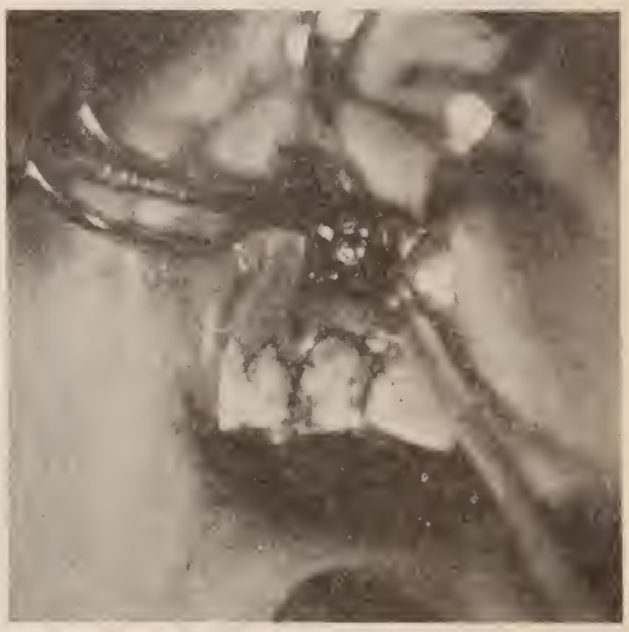

Fig. 8

Fig. 7: This tissue is taken hold of with tissue pliers and with a blunt chisel the periosteum is lifted from the process as a flap is formed.

Fig. 8: In this particular case a well-organized periosteal granuloma was present, which after the flap was made, was dissected from the under side of the flap. With a delicate knife this was taken out intact.

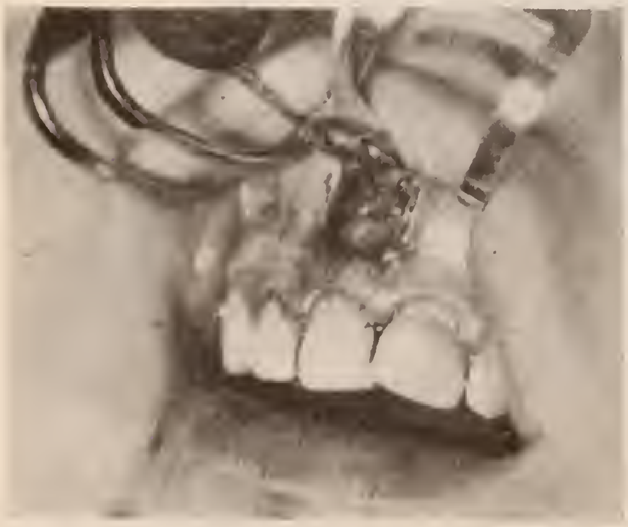

Fig. 9

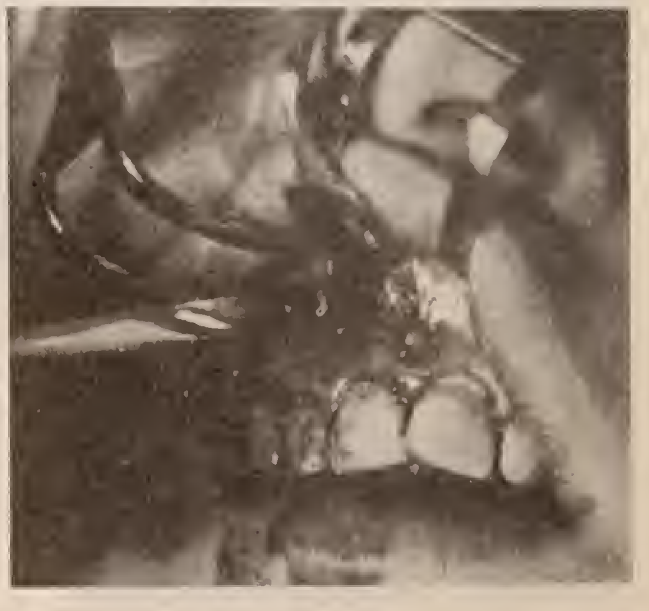

Fig. 10

Fig. 9: A three-tined flap retractor is now placed in position and held by one hand of the assistant. The illustration shows a probe in the sinus through the osseous plate.

Fig. 10: With a chisel two vertical cuts are made through the process on either side of the root, when another cut is made horizontally at the lower edge of the other two, after which the plate can be lifted up and broken off at the upper edge. With a large round bur the edges are smoothed up and the opening is enlarged as the case may indicate.

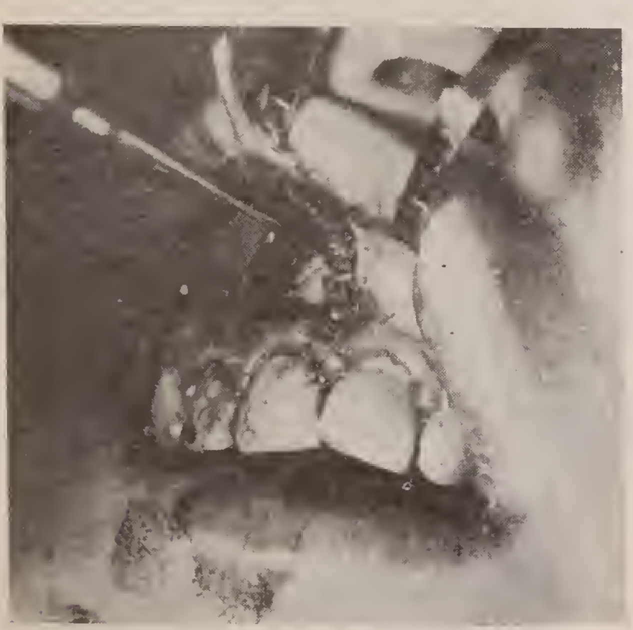

Fig. 11

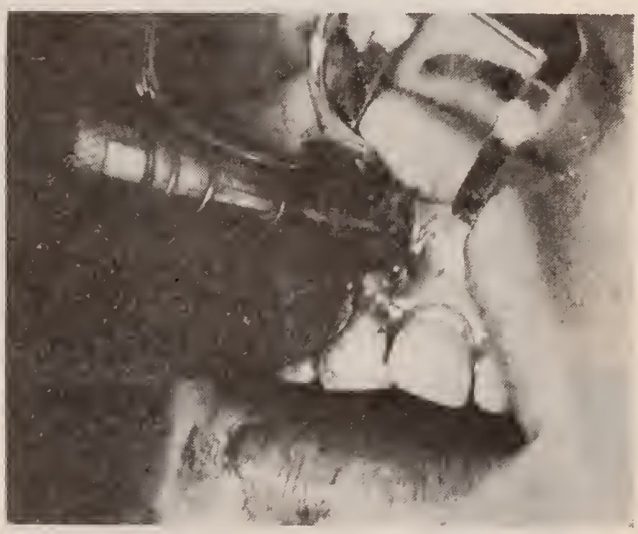

Fig. 12

Fig. 11: With a sharp steel probe one can now explore the sides of the root and find out how far down disintegration has taken place, thus showing where the root should be resected, which should be just immediately beneath the disintegrated tissue. This will leave the new root-end completely surrounded with healthy tissue.

Fig. 12: The root-end is now cut off with a pointed-end, smooth fissure bur in the hand-piece. Some operators prefer to cut off the root-end with a chisel, but personally I like the fissure bur better.

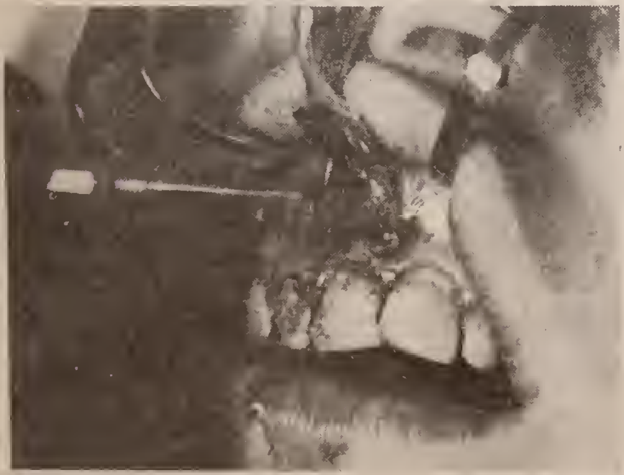

Fig. 13

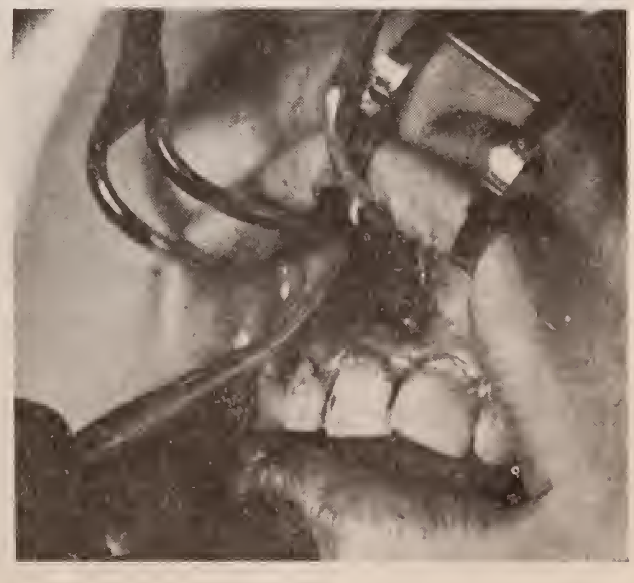

Fig. 14

Fig. 13: After the root-end is free from the root it is carefully examined to see if it is free from the granuloma, if one be present. In this particular case it was, and at this time it is removed by inserting any small instrument beneath it and rolling it out. In case the apex extends well into the granuloma and is more or less attached to it, as it usually is, do not attempt to tear it away, but remove it insitu with the granuloma in the next step.

Fig. 14: With Black's special spoons (numbers 55 to 72 inclusive), you are now ready to dissect out the granuloma. A selection from these instruments is made depending upon the size and contour of the crypt. Even a number of them are used sometimes, including both rights and lefts. They easily will follow the walls of the crypt and dissect loose the granuloma without puncturing it.

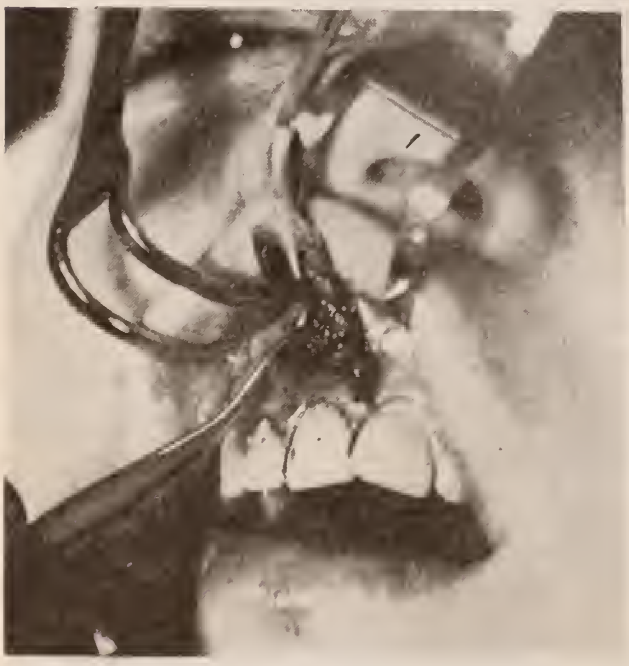

Fig. 15

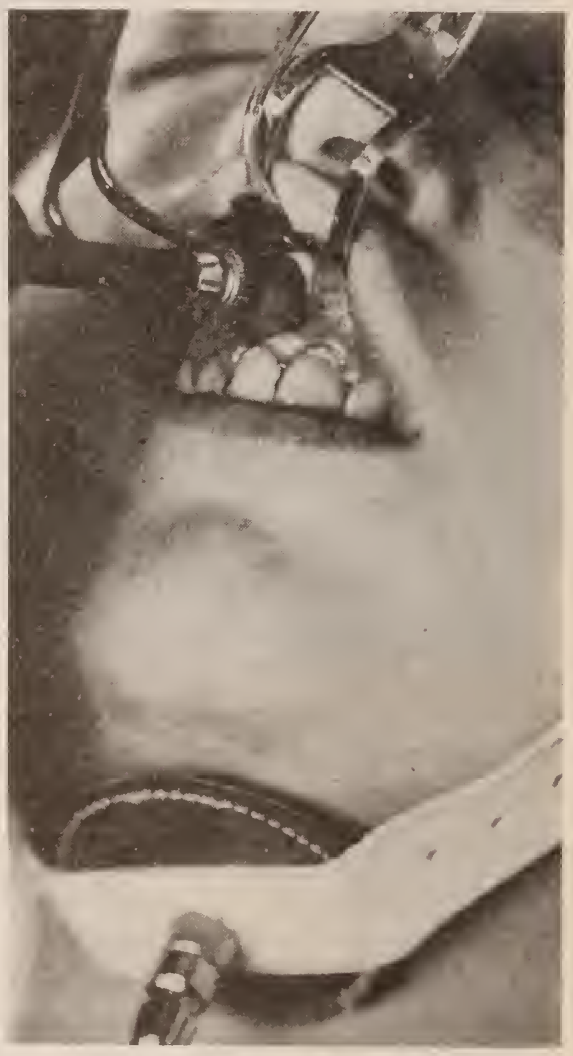

Fig. 16

Fig. 15: It is then rolled out of the crypt and any stray shreds that hang to the wall and any necrotic bone that may be present is curetted away. The root-end should then be polished with rapidly-revolving burs and stones. The crypt is flushed with normal salt solution and dried, when a careful examination with a probe is made to ascertain the perfectness of our work to date. At this time if the root-canal filling does not hermetically seal the canal at the newly-formed apex, undercuts can be cut with a small bur and an amalgam filling inserted in the canal.

Fig. 16: The wound is now ready to be ionized, and for this purpose we use a three-per-cent. aqueous iodin solution with five m.a. current

for five minutes, using a platinum-anode electrode. The cathode indifferent electrode may be fastened to the chin as in the illustration; however, I usually prefer the indifferent electrode on the wrist.

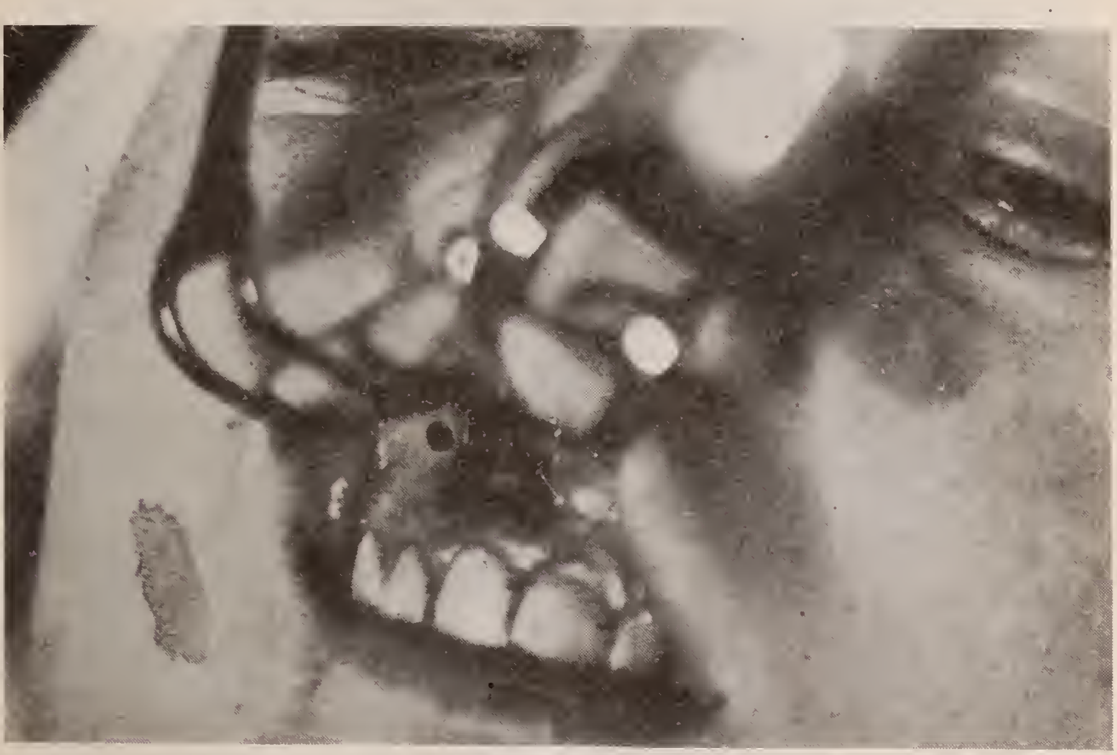

Fig. 17

Fig. 17: The bony crypt is now filled with blood, after stimulation and just previous to suturing. In case the crypt is extensive and it is not deemed advisable to close it at once, it should be packed with sterile gauze, preferably iodoform gauze.

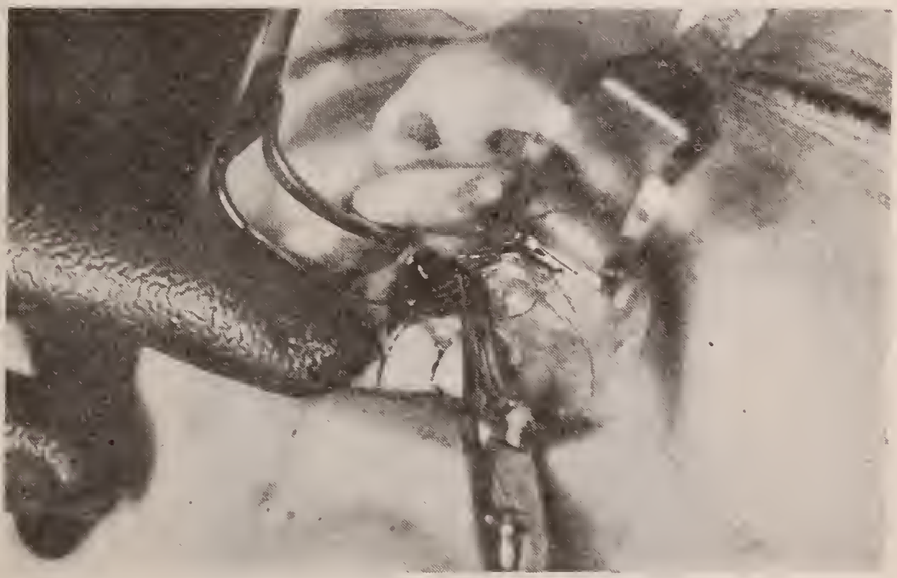

Fig. 18

Fig. 18: Usually, unless quite extensive, the wound may be entirely closed and the clot will organize without any treatment. Three stitches usually are all that is necessary to completely close the wound. The sutures used are horse hair.

Fig. 19: The finished operation. The suture line may be painted with tincture of iodin. However, this is not a necessity, but I think a good practice.

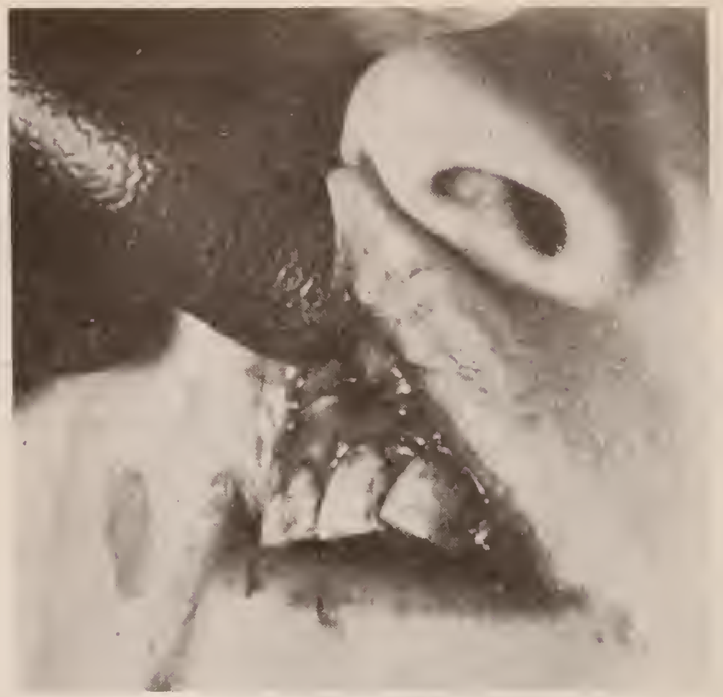

Fig. 19

Fig. 20: In three days the sutures may be removed. The wound usually heals by first intention.

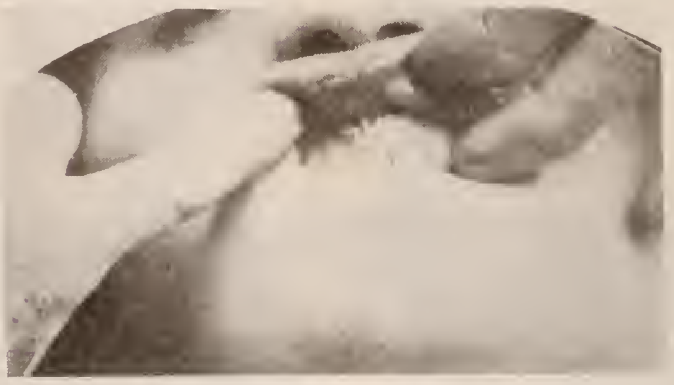

Fig. 20

Fig. 21: Radiograph taken immediately after completion of the operation.

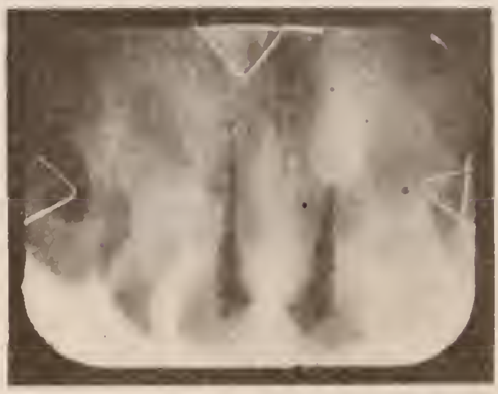

Fig. 21

Fig. 22: The instrumentarium for the operation is not necessarily so elaborate and is not exactly of a specific nature. The individuality of the operator will have to be satisfied in this respect. The end result

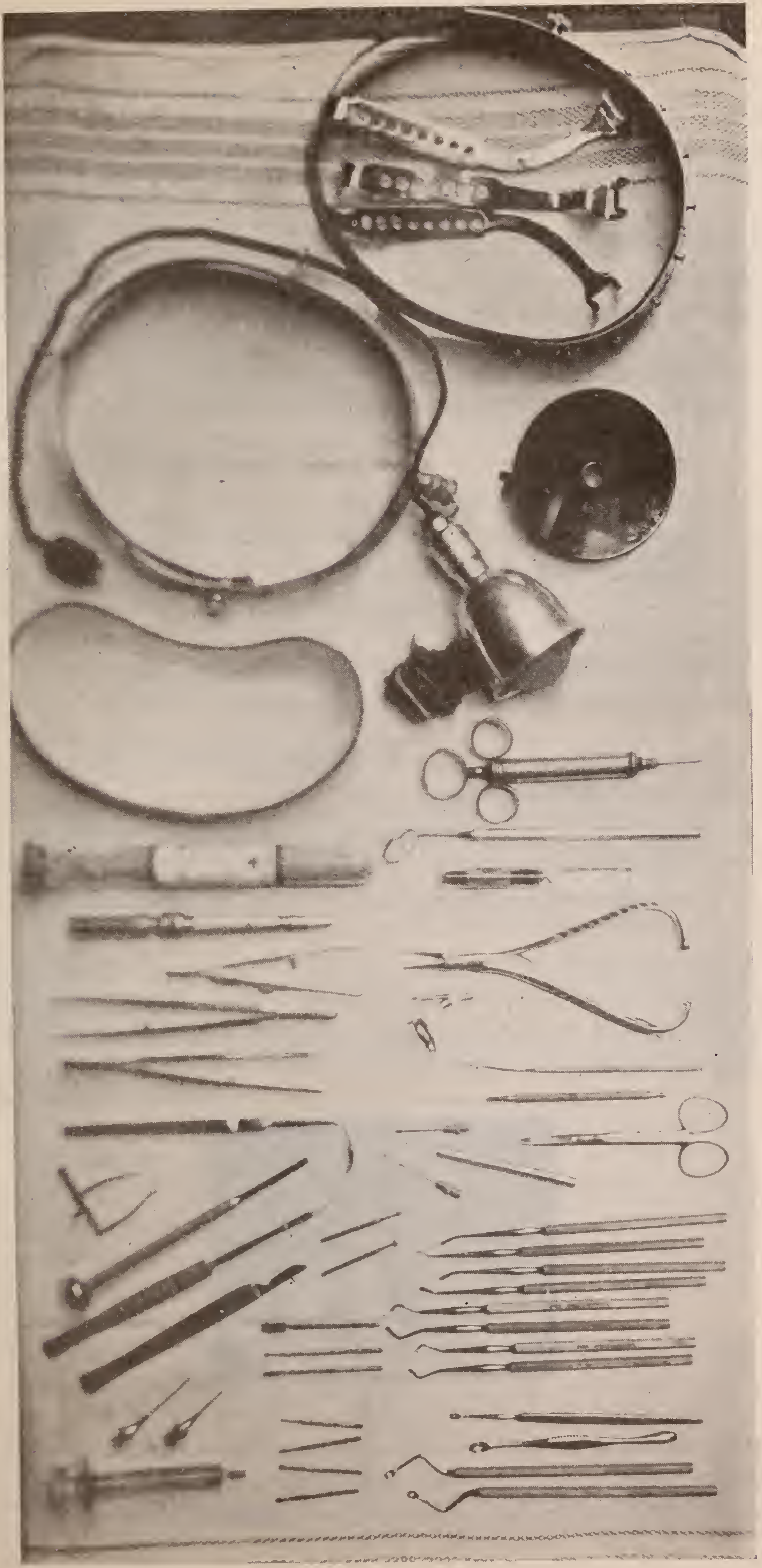

Fig. 22

is what we want and it matters not what you use to attain that end, so you attain it in the best way for both yourself and patient.

Fig. 23: Bacteriological report. The culture made from the root canal proved to be sterile, but a smear from it showed among other things streptococci. The sterile condition of the culture was probably due to the fact that the cavity was hermetically sealed and the culture was taken from the coronal end of the canal. The culture from the inside of the granuloma showed the presence of staphylococcus albus.

Fig. 23 INDIANA STATE BOARD OF HEALTH

LABORATORY OF BACTERIOLOGY

Indianapolis, February 26, 1917.

Dr. Earl Brooks,
Noblesville, Ind.

Dear Doctor: Examination of the specimen of granuloma culture from your patient shows staphylococcus albus (W.S.).

Will Shiner, (H.) M.D.,
Superintendent.

Specimen received Feb. 24, 1917.
Reported Feb. 24, 1917.

INDIANA STATE BOARD OF HEALTH

LABORATORY OF BACTERIOLOGY

Indianapolis, February 26, 1917.

Dr. Earl Brooks,
Noblesville, Ind.

Dear Doctor: Examination of the specimen of root-canal culture from your patient shows culture sterile. Smear made from the culture shows some unidentified bacilli pus cells and streptococci.

Will Shiner, (H.), M.D.,
Superintendent.

Specimen reported Feb. 24, 1917.
Reported Feb. 24, 1917.

Fig. 24: Radiograph of the case, May 14, 1917. The operation was performed on February 20, 1917. By this picture you can see that the crypt is nicely filled with well-organized osseous tissue. This is unusually well filled for so short a time.

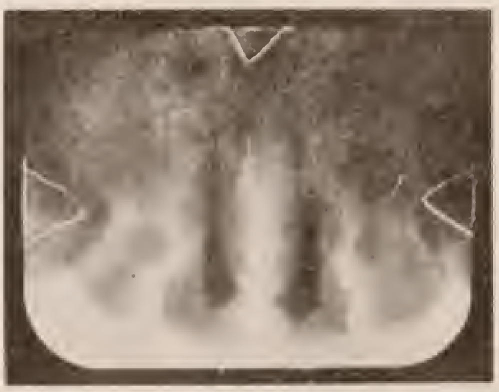

Fig. 24

From the history you remember that this patient suffered from rheumatism of the shoulder and "stiff neck." Since this operation to date there never has been the slightest manifestation of either.

INDICATIONS AND TECHNIC FOR ROOT RESECTION*

BY CARL D. LUCAS, D.D.S., INDIANAPOLIS, IND.

IN VIEW of the fact that the most recent bacteriological findings of the National Research Institute indicate that focal infection remains, although the process of ossification, according to radiographic interpretation, may completely regenerate bone in an area of rarefaction or central necrosis at the apex of a chronically-abscessed tooth after its apparently successful treatment and final complete canal filling, it seems that surgical intervention is the only rational technic for the complete eradication of such foci.

Cultures made of the aspirated contents obtained from the sockets of chronically-abscessed teeth, immediately after their extraction, although they may have remained quiescent for from five to fifteen years, and have been tentatively diagnosed by means of the radiograph as non-pathogenic, grow pure cultures of streptococcus viridans. Therefore, since this field of dental therapeutics has been demonstrated inefficacious, we must admit that our periapical therapy of the present is not rational but empirical.

Ionotherapy was employed by the medical profession in the treatment of suppurative arthritis and abandoned therapeutically over twenty years ago. This therapy is acknowledged prophylactic only to lesions of infection; therefore necessarily is not specific in the treatment of periapical infections.

Since iontophoresis and therapeutics cannot at present be relied upon as successful measures in the treatment of periapical foci of infection, our choice for the complete eradication of these lesions lies either with extraction of the diseased teeth and curettage of the pyogenous granulomata, or apical root resection and subsequent curettage of this pathogenic tissue.

The acute alveolar abscess, which has not denuded the apex of a tooth from its pericemental membrane may be successfully treated therapeutically. However, if a necrotic area with extensive periapical-tissue degeneration, which furnishes an ideal pabulum for the pathogenic micro-organisms present, is diagnosed by a shadow upon the radiographic negative, indicating a rarefied bone area, therapeutics serve only to attenuate the invading streptococci.

The internist does not rely upon drugs to eradicate infection in a field of reciosis. Surgical curettment of the area and subsequent drainage, or possibly irrigation with physiological saline solution as a prophylactic measure are resorted to for the cure of such lesions.

Inherent physiological resistance, surgical rest, diatetics, stimulated elimination, and occasionally injected antigens are relied upon to physiologically produce a cure, after the surgical removal of the infected bone and pathological tissues. Logically we must proceed upon the same hypothesis until some future time when we may hope for a rational sequence in periapical therapy.

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*Read before the Four-State Post Graduate School, New Orleans, La., June 1917.

The indications for root resection of chronically-abscessed teeth are limited, therefore, only by the relative amount of osseous destruction which will permit of retention of the tooth root by the alveolar process intact, after the resection of the diseased apex.

If by radiographic interpretation we conclude that the infection has caused so much of the root to be denuded of pericemental attachment, and the alveolar process has been liquefied by necrosis to a point which would not permit of sufficient support to retain the tooth after resection, extraction and curettage is the procedure of choice. This can be illustrated only by demonstration with lantern slides, which shall be thrown upon the screen later.

A definite diagnosis by means of a radiographic negative film should be made and a rational prognosis of the ultimate result must be reasonably positive.

The field of operation is first anesthetized, preferably by conductive anesthesia, before the operator and nurse scrub up for the operation.

PREPARATION OF OPERATOR AND PATIENT

After the operator has thoroughly scrubbed his hands and bathed them in a sterilizing solution of five per cent. lysol, rinsed them in sterile water, followed by seventy per cent. alcohol, he must be clothed in a sterile gown. The patient is then draped with a sterile sheet, a sterile towel is placed around the patient's hair, and the head-rest is covered with a sterile towel, pinned securely in place. The patient's face is then scrubbed with seventy per cent.alcohol, and another sterile towel is placed under the chin, and the ends pinned together over the towel which covers the hair, leaving only the mouth, lips, cheeks and nose exposed. The patient is placed in a recumbent position and a sterile head-band, which is to hold the lip retractor in place, may be adjusted. A sterile saliva ejector can be used to advantage, if the operation be performed in a surgical dental office. A surgical nurse, clothed in a sterile gown and properly scrubbed up for assisting in the operation, should be in attendance.

All the teeth which will be exposed during the operation and the mucous surfaces of the lips and gums should be sponged with a seventy-per cent. alcohol, and tincture of iodin should be lavishly applied to the crowns of the exposed teeth.

Sterile cotton rolls or sponges are placed under the lip, anteriorly and posteriorly to the immediate field of operation, and the sterile lip retractor is adjusted, attaching it to the head-band.

All instruments, the engine hand-piece, cotton pellets, sponges, towels, operating gowns and everything with which the operator or nurse may come into contact, the instrument table-top and all appliances used must be absolutely sterile.

SURGICAL TECHNIC

A crescent-shaped incision through the gum tissue and periosteum is made approximately three millimeters above the cervical line, or below it for a lower tooth, and the periosteum with its superimposed gum tissue is elevated with a periosteotome to a point one millimeter beyond the apex of the tooth to be operated. The incision must be sufficiently large to give an unobstructed view of the operative field.

If the outer plate of bone is intact it is burred, chiseled or curetted away to the diameter of the pyogenous granuloma and this pathologic tissue may then frequently be removed from the crypt intact, excepting its immediate circumferential attachment to the periphery of the pericementally-denuded root. The exposed apex and the crypt is then sponged with a ninety-five per cent. phenol, being careful not to touch the soft tissue with the acid.

A No. 9 round bur is used to resect the root to the point where it is supported by the pericemental fibers which are attached in the canaliculi of the alveolar socket and between the lamellæ of the cementum, beginning the resection at the apex of the root.

The remaining root end is then rounded peripherally and polished with mounted cylindrical stones. A self-retaining cavity is then prepared, with its axis in the pulp canal, and this cavity is filled with sterile amalgam. Before the amalgam is inserted the crypt should be freshened with the curette and sterile cotton pellets packed into the crypt, around the mesial, distal and lingual aspects of the root end, and the cavity for the reception of the amalgam filling sponged with phenol, followed with a seventy per cent. alcohol.

The filling must be smoothed off flush with the cavity margins and the pellets of cotton removed, carrying the excess of amalgam from the crypt. The crypt is then flushed free from debris, dried and sponged with tincture of iodin, followed by seventy per cent. alcohol. The retracted musoperiosteal flap is then released and sutured back to position with interrupted horse-hair sutures, bringing the knots crownward below the suture line, cutting close to the knots.

The blood clot which forms and fills the sterilized crypt is derived from the blood supply of the haversian system of the bone, and from the capillaries which are ruptured by the needle in placing the sutures. This clot is antiseptic, therefore is the best surgical dressing for the crypt and should not be disturbed. Packing the wound with gauze or subsequent irrigation of the wound is not only unnecessary but is contraindicated.

The patient should use a normal saline mouth wash every two hours for four days after the operation, and the operator should see the patient every twenty-four hours following the operation for five days, spraying the surface of the flap with some mild antiseptic, such as a two per cent. phenol solution.

The sutures may be removed the fifth or sixth day, when healing of the flap by first intention will have been completed. Embryonic fibroblasts will be generated from the endothelium of the capillaries and be deposited within the organized blood clot, forming a fibrous matrix. Osteoblasts will be deposited within the fibrous matrix and subsequently osteanagenisis will completely fill the crypt with reconstructed bone, similar to the histological callus of an united fracture.

It is preferable to have had the pulp canal sterilized and filled with gutta percha, *a la Callahan*, a few hours before performing the operation. If the root in question supports a pin crown and the pulp canal is incompletely filled, the amalgam filling in the canal of the resected root end will prevent secretions from entering the pulp canal or infection from within the canal from invading the operated field.

By following the outlined technic of closing the wound with sutures the resultant scar will be linear, which is cosmetically preferable to a scar which results from leaving the wound open. By relying upon the organized antiseptic blood clot as a surgical dressing in the crypt, post-operative osteodynia is much less severe and the introduction of extraneous infection is precluded.

It is advisable to have the pulp canal of any of the lower anterior ten teeth enlarged and filled with amalgam before attempting apical resection. It is practically impossible to prepare a cavity in the end of a resected lower root on account of the acute angle at which the lower teeth are placed to the plane of operation.

Buccal roots of upper first and occasionally second molars, depending upon the size of the mouth, may be successfully resected. It is frequently necessary to completely dissociate one of the buccal roots of an upper molar. The exposed canal in this case should be made self-retentive and filled with amalgam. The same may be said of the lingual root of the upper first or second molars.

The percentage of successes in this operation is at least ninety-eight per cent. positive, therefore we do not hesitate to present and urge this technic as the procedure par excellence for the definite, complete and rational treatment of any chronically-abscessed upper or lower, central or lateral incisor, cuspid, first or second bicuspid tooth.

Hume-Mansur Bldg.

SELECTIVE ANESTHESIA FOR HAZARDOUS RISKS AND DIFFICULT ORAL PROCEDURES*

BY DR. THOMAS G. ALLER, PHILADELPHIA, PA.

SINCE surgical judgment should be listed as the highest center in a surgeon's brain, to distinguish him as a careful and safe operator, so selective anesthesia should be considered as the most essential qualification for a professional anesthetist; for it is often the judicious selection of the appropriate anesthetic for a given case that wins or loses the day. To develop this faculty one must be alert and observing and learn from experience and a study of the literature on anesthesia and anesthetics.

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*Read before the Interstate Association of Anesthetists, Toledo, O., Oct. 1917.

In order to have some definite rule it is well to analyze in each individual case the advantages of the various agents and methods we have at our disposal as in the order suggested by Bevan[1]:

First: Safety.
Second: Comfort.
Third: Efficiency.
Fourth: Control.
Fifth: Simplicity and general adaptability.
Sixth: After-effects on blood and tissue and viscera.
Seventh: Complications, vomiting, etc. Paresis of the bladder and bowels.
Eighth: Effect on immunity to pus organisms, pneumococcus, etc.

You will note from the above that the author believes in "Safety First." The anesthetic should be adapted to the case and not the case to the anesthetic, as is sometimes done because of "hobby."

Authorities[2] are of the opinion that the responsibility of the choice of an anesthetic and skillful administration of the same in ordinary and hazardous cases rests with the surgeon. Nevertheless, the opportunity to recommend or select a certain anesthetic for a given case is often extended to the expert anesthetist and he should respond decisively and accurately.

DeCosta teaches that any case taking an anesthetic always has one foot in the grave. Therefore, it is well to inculcate into our minds the fear of anesthetics so that we will realize that they may be fatal if not attentively handled even in simple cases.

Idiosyncrasies should be thought of in all cases, and it would be well to inquire into the past history of each patient regarding this, while examining him physically, getting his reflexes, etc. If the patient states that he has had a certain anesthetic previously, had taken it poorly, had bad after-effects and greatly fears it again, it would be advisable always to give that patient the benefit of the doubt and administer some other anesthetic than the particular one he had taken previously.

In cases having grave fear and apprehension because of their high-strung, nervous makeup, or because of Grave's disease, it is preferable to administer sedative medication previously. If time permits, the Mayo method of having the anesthetist visit the patient for five or ten minutes each day and administer perfume through gauze on one day, another day give essential oil of orange through gauze, and finally by anethol or N_2O and O really anesthetize the patient in her bed, and then keep her under the finally selected anesthetic while being taken to the operating room and during the operation.

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[1] Bevan, J. A. M. A., Vol. LXV, No. 77.
[2] Jour. A. M. A., Vol. LXIX, No. 13, p. 1104.

There are three primary cardinal underlying principles relative to the safety of any anesthetic in any case, and especially in hazardous cases. They are:

First: Purity of the drug.

Second: Freshness of the drug.

Third. Competency and efficiency of the anesthetist.

For difficult oral procedures, three general anesthetics should be considered: Ether, nitrous oxid and oxygen, and chloroform.

Your essayist is one of those who considers ether to be the safest known general anesthetic for long operations, and where not especially contraindicated, the anesthetic of predilection.

While the open-drop method is in favor for general surgery in Pennsylvania, the intratracheal or the intrapharyngeal is the best for oral surgery, as it does not need as much manipulation for adjustment of tubes as does intratracheal, nor does it involve as much risk of infection being forced into the lungs, if infection is present in the oral wound previous to operation, as it often is.

However, ether would be contraindicated in the following: Status lymphaticus, acute chronic pulmonary lesions, pathological changes in the respiratory organs and dyspnœa[3]; also nephritis, phthisis, emphysema.

If the case is not one of great emergency, acidosis should be looked for beforehand and treated. This is especially prone to occur in cases of diabetes, carcinoma, digestive disturbance, starvation, gastric ulcer, excessive fat ingestion, fever, chronic morphinism and fatty livers.[4]

In all hazardous cases it should be borne in mind that the exciting stage can and should be avoided[5] by securing the confidence of patient beforehand, judicious premedication, and starting the etherization with anethol, nitrous oxid-oxygen, or orange oil, followed by slow and gradual open-drop ether.

If the exciting stage is omitted, the patient kept warm with arch of back supported, the minimum of ether administered to keep the patient really under but not saturated, and the patient not kept under any longer than the operation actually demands, we may expect good results.

Baldwin[6] in his Notes on Shockless Operation, gives convincing evidence that speed, gentle manipulation and hemostasis are the requirements of a good surgeon to prevent shock. Therefore, a competent anesthetist, one who is conscious of the exact condition of the patient, working in conjunction with a good surgeon on a hazardous case, will get the best results with ether open-drop method in long operations.

In excision of the tongue, of the lower jaw or difficult impacted teeth, the intrapharyngeal administration is to be preferred. In excision of the upper jaw, intratracheal administration is preferable.

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[3] Kocher.

[4] Gwarthmey, Anesthesia, 1914.

[5] Connell, Art. Anesthesia, Johnson's Oper. Dentistry.

[6] Baldwin, J. F., Surgical Papers, 1917.

Nitrous oxid is best used for short operations. On inquiry it will be found that nitrous oxid-oxygen has been discontinued for long operations in the Mayo clinic, by Ochsner,[7] Bloodgood and others. It may be selected in cases of acute pulmonary congestion or of acute nephritis. It should be considered in cases of acute rhinitis. It should never be given to children under four years of age because of poorly-developed respiratory power. If given to the aged with flabby musculature, cases fatigued by loss of sleep or lack of food, it is well to precede it by a drink of sherry. It is contraindicated in drug addicts, powerful muscular builds, cases that have had athlete's heart, alcoholics and myocardial cases; in brain surgery, valvular disease, women during physiological epochs, the obese and asthmatics; also status lymphaticus, epileptics, patulous foramen-ovale, atheroma of arteries, aneurism, hypersensitivity or enlargements of tongue and pharynx.

CHLOROFORM

Although generally condemned by the profession, probably because of improper administration, chloroform is valuable in military work. In children, with the Junker method as modified by Brophy, it is preferable. For cleft-palate operations on very young children ether may be used to begin with and then the tube from the Junker bottle be introduced and the minimum amount of chloroform given (two per cent. chloroform, ninety-eight per cent. air).

Contraindications: Marasmus, diabetes, acidosis and heart lesions.

Novocain and adrenalin may be advised where ether, nitrous oxid and oxygen are contra-indicated except that the adrenalin should be cut down or eliminated in kidney lesions, acidosis or atheromatous cases. Novocain and adrenalin seem to be superior to beta-eucain for oral surgery.

Local anesthesia should be favored in status lymphaticus, epilepsy, patulous foramenovale. In cases with history of cerebral embolus or apoplexy, angioneurotic edema, athletic heart, bronchial asthma and fatty heart. It should be considered in pregnancy and lactation.

CONCLUSION

Your essayist is of the opinion that (*a*) ether by the intrapharyngeal method is the anesthetic of choice in hazardous oral surgical operations, with the exceptions above noted. That (*b*) chloroform is desirable for children with cleft palates and that (*c*) novocain may be used with advantage where ether or nitrous oxid and oxygen are contraindicated, where the full co-operation of the patient can be had and the field of operation can be completely infiltrated and anesthetized with a safe amount of novocain and minimum amount of epinephrin.

1126 Spruce St.

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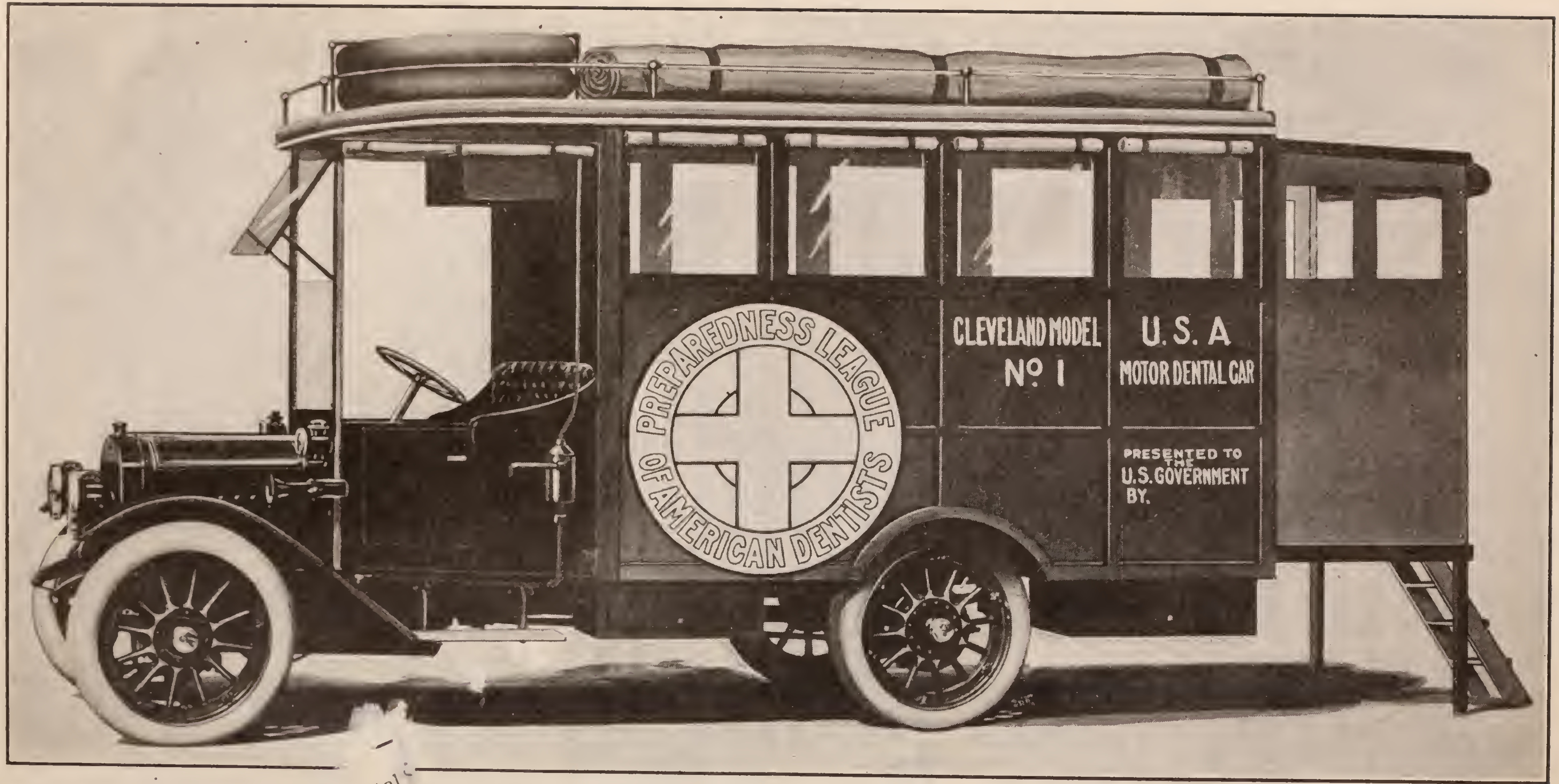
[7] Ochsner, Manual of Surgery, 1915.


PREPAREDNESS LEAGUE OF AMERICAN DENTISTS
CLEVELAND MODEL
Nº I
U. S. A
MOTOR DENTAL CAR
PRESENTED TO THE U.S. GOVERNMENT BY.

This is the completed Motor Dental Car that has been designed and standardized by the Ambulance Committee of the Preparedness League of American Dentists, and accepted by the War Department, three of which are under construction and will be tried out in the various cantonments with the idea of testing out efficiency of equipment before being sent overseas. ¶ The profession will be notified through the magazines when and where these cars can be seen in operation. The present cars are being built in Cleveland under the supervision of Dr. S. M. Weaver, Chairman of the Ambulance Committee.

THE NEW MOTOR DENTAL CAR APPROVED BY THE U. S. GOVERNMENT FOR USE IN THE WAR*

The following illustrations will demonstrate the interior views and equipment of the car:

Fig. 1 shows the floor plan of car, with approximate positions of cabinets, chairs, etc.

Fig. 2 shows a side view of body, with railing on top to hold baggage; place for extra tires and pump on side of car to fill water tank.

Fig. 3 shows rear view of unit set up ready for operation, all enclosed. Note the canvas door in rear of main body and also in each tent.

Fig. 4 shows side elevation of tent in position, showing the method of lighting through top of tent. Also shows portion of seat raised to make a bed twenty-six inches wide and six feet long for the mechanician to sleep on.

Fig. 5 shows rear view of unit with tents folded against side of body. Please note all tent poles are collapsible steel rods, so as to occupy as little space as possible. All parts are kept intact to obviate danger of loss.

Fig. 6: This illustration shows method of obviating shrinkage and expansion in the cabinet work.

Fig. 7 shows method of holding cabinets to disc of body, the spring inserted between body and back of cabinet.

Fig. 8 shows method of attachment to the floor, with spring on bolt.

Fig. 9 shows cabinet as designed.

Fig. 10: Method of holding bottles in position with phosphor-bronze clamps.

Fig. 11: Harvard chair.

Fig. 12 shows equipment in position, ready for operation. The fountain cuspidor does not belong in this illustration; a new device has been arranged so that the cuspidor will be attached on a bracket similar to the one holding the engine. Please note the advantage of the hand-friction clamps, enabling the operator to clamp each joint in any position required. The aluminum table in this bracket weighs less than one pound. All brackets are made of aluminum castings, enameled gray. The engine is Electro Dental, six-volt motor, run from storage batteries.

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*It is a pleasure to be able to present our readers with this illustrated description of the official motor dental car for army use. As lucid as the description is, however, it cannot impress one as does seeing the car itself. It was our good fortune the other day to inspect one of the cars under the guidance of Dr. Weaver, who has been appointed on the Council of National Defense Committee to look after the designing and equipping of motor dental cars to be used in the army, and we can say that for convenience, compactness and utility it is a marvel.

Fig. 13 shows same equipment with engine and bracket table clamped to wall ready for transportation. Please notice the bracket table is removed and slipped into a slot in the wall. As in previous picture, the round table should not be included.

Fig. 14: Demonstrating the compressed air tank, the position of which is shown in floor plan in front corner behind the Bosworth sectional benches. Illustration on the right demonstrates an alcohol stove equipped with two warming plates, one for miscellaneous use and the other, as seen in illustration, to heat a three-gallon reservoir of water to be used in lavatory. The top section holding the spray bottles telescopes down inside the water tank. By so doing we use the same heat both for warming the spray bottles and the water. This tank is filled through the cap as seen in the middle of the spray bottles.

Fig. 15: Sectional sterilizer, capable of sterilizing both instruments and gauze.

Fig. 16 shows interior view, front of car. Note thirty-gallon water tank, Bosworth sectional benches, position of hot water heater relative to lavatory; also note cold water connection from tank to lavatory.

Fig. 17: Side view showing instrument cabinet and space over wheel house occupied by clothes closet with drawers and pigeon holes for personal effects. Also mirror lifting out of top lid for the boys to use for shaving.

Fig. 18: Portable chair, carried inside car, to be used in tent when equipment is set up for operation.

Fig. 19: Cleveland dental portable engine.

Fig. 20: Northwestern students' case, to carry instruments for use in tents.

Fig. 21 shows side view of completed motor dental car (frontispiece) with suggested inscriptions. Please note how all the windows have roll canvas curtains on outside that are buttoned down when desired. The windows are hung on transom appliances so they can be opened out from the bottom, and when canvas curtains are buttoned down they act as awnings. The front compartment can be closed completely to keep it all firm. The roof of the rear section, which is composed of the upper half of the end gate, has four large windows which act as a skylight for operating. Note the large storage box over the driver's seat, dimensions of which can be seen in previous illustration; also the one in front and back of the rear wheels. The entire body of the car is made of the best seasoned oak, properly held in place with hand-forged angle irons. The deck is covered with 16-gauge steel plate, padded, with a super

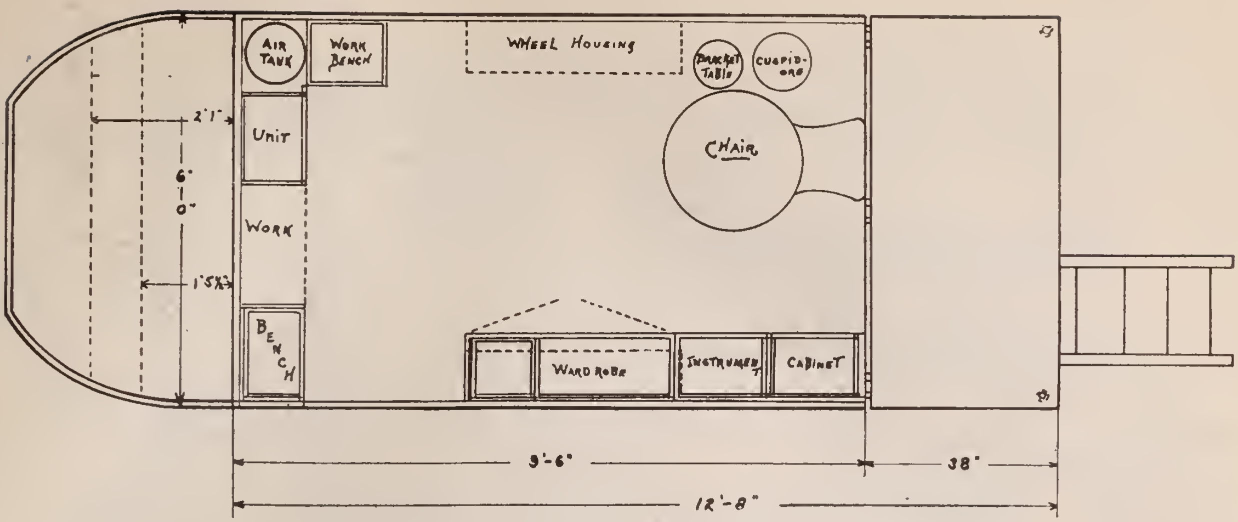

Fig. 1—Floor plan.

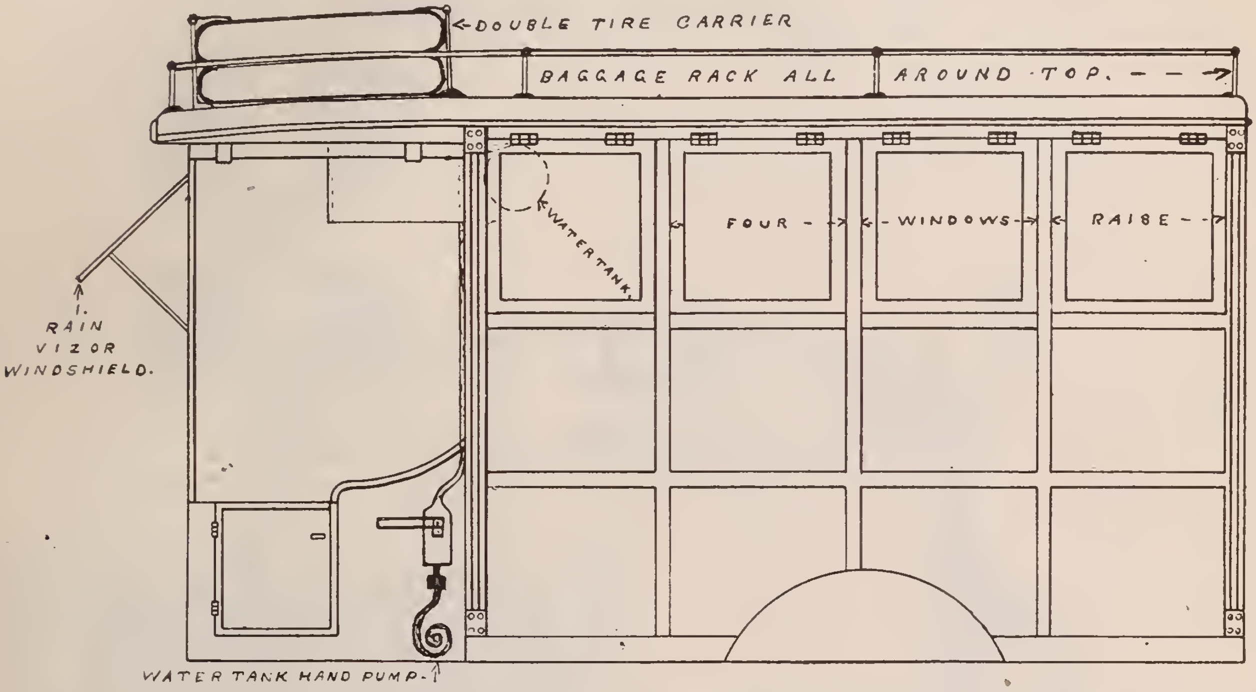

Fig. 2—Side view.

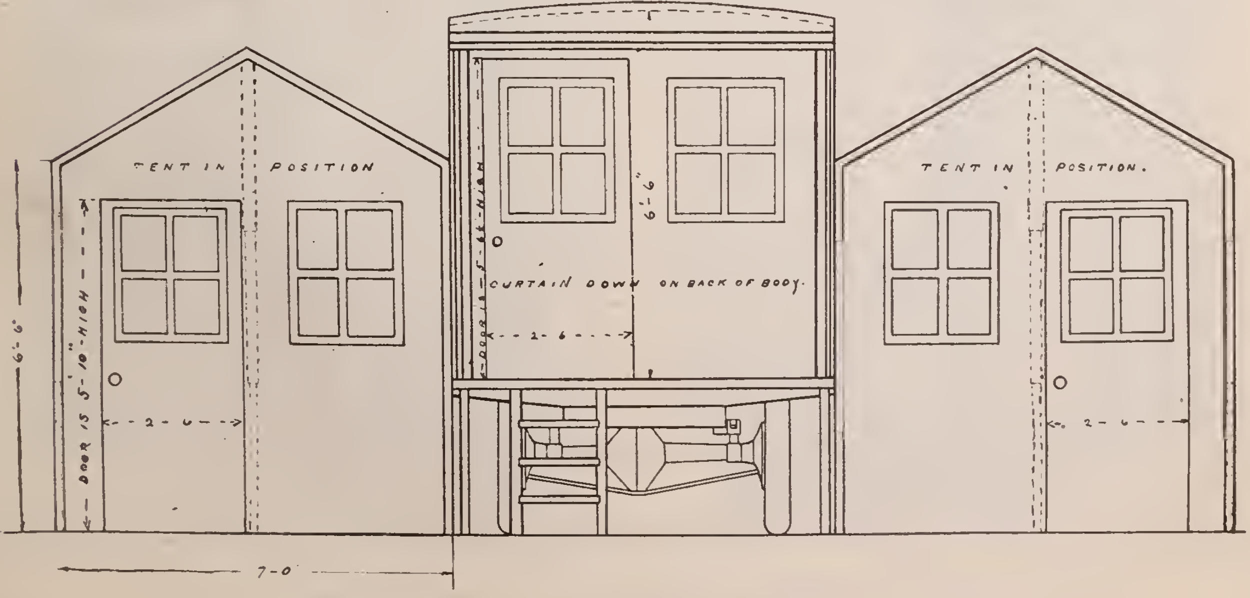

Fig. 3—Rear view.

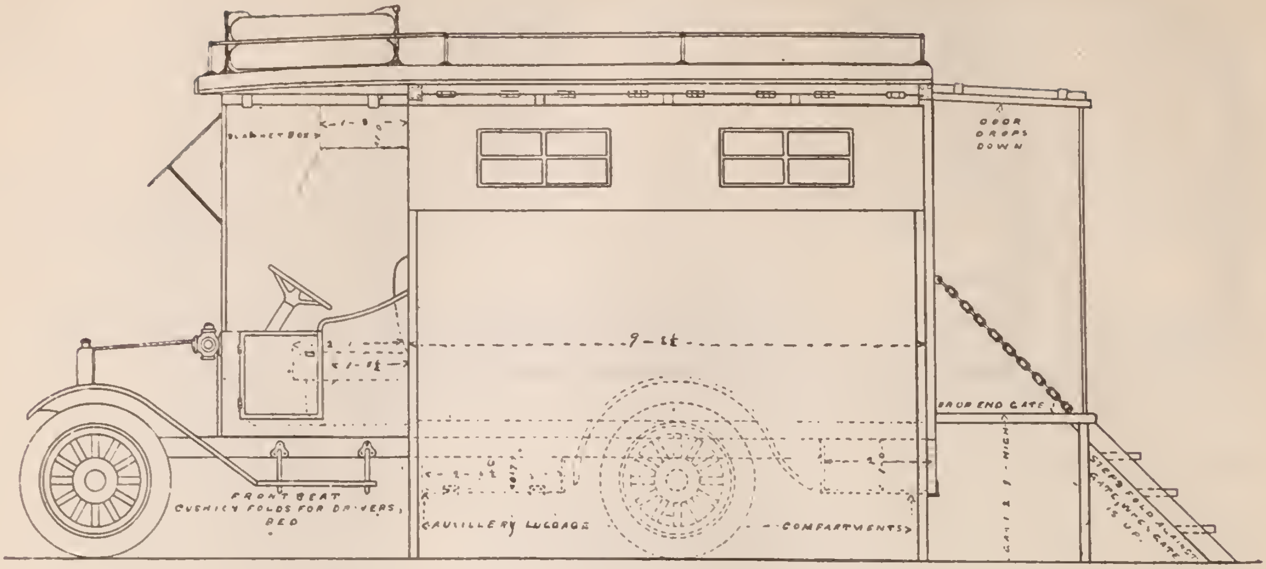
BLANKET BOX
DOOR DROPS DOWN
9-ft
DROP END GATE
FRONT SEAT CUSHION FOLDS FOR DRIVERS BED
AUXILLERY LUGGAGE
COMPARTMENTS
STEPS FOLD AGAINST GATE WHEN GATE IS UP

Fig. 4—Side elevation of tent in position.

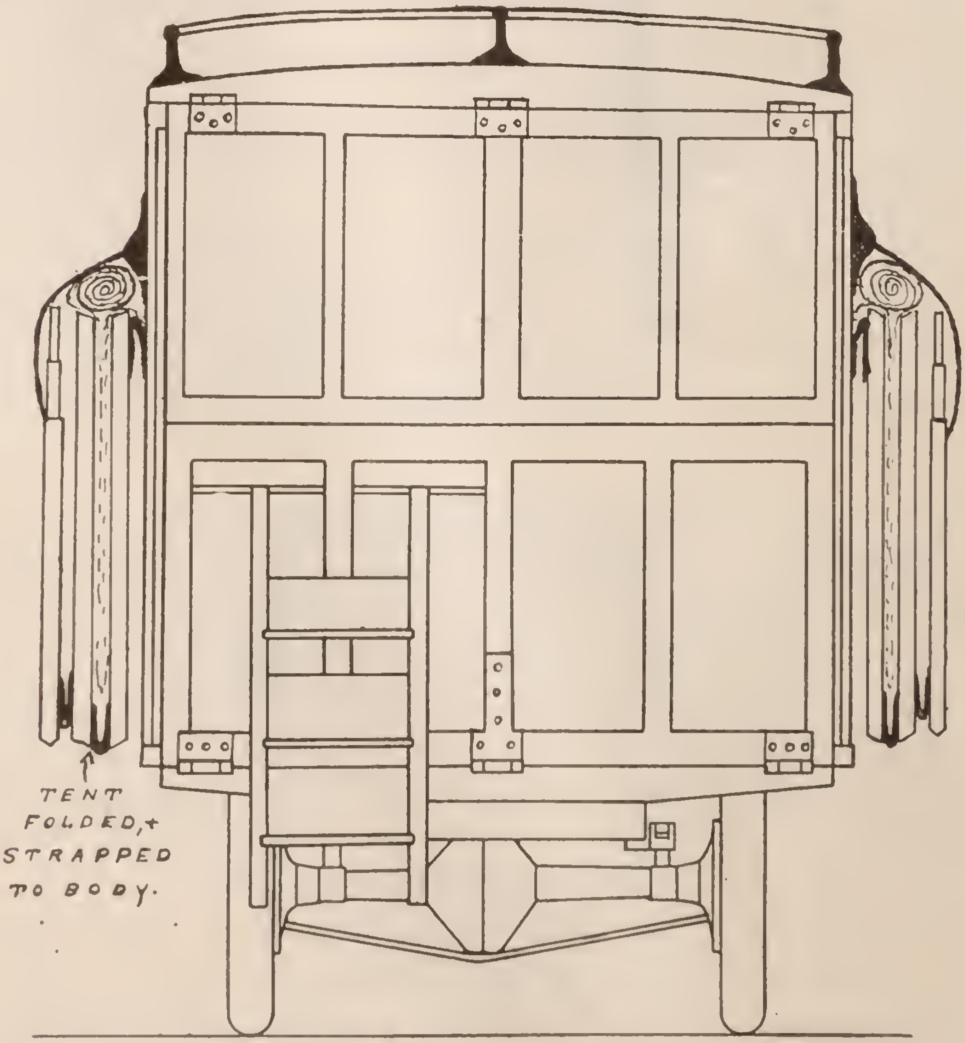

Fig. 5—Rear view of unit with tents folded.

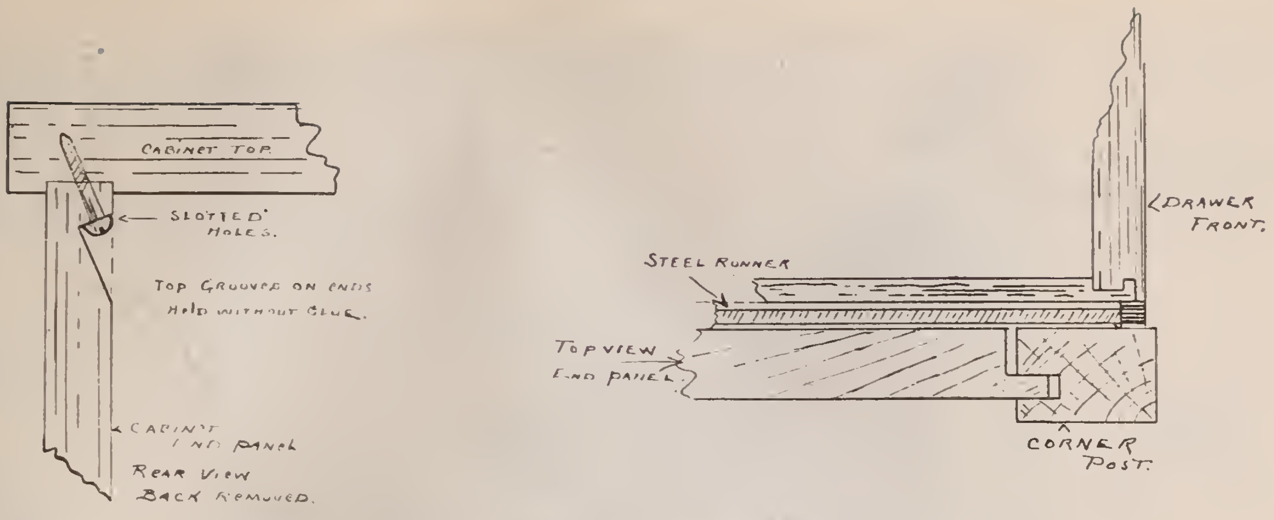

Fig. 6—Method of obviating shrinkage and expansion.

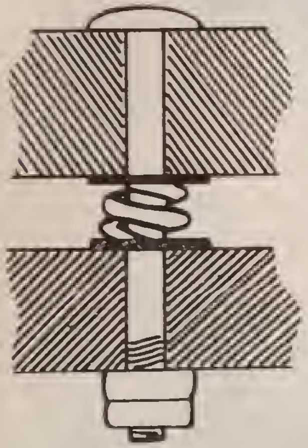

Fig. 7—Method of holding cabinets.

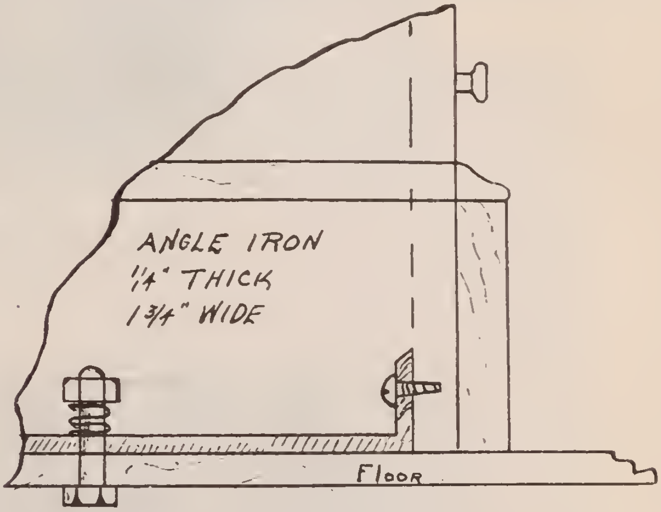

Fig. 8—Spring and bolt attachment.

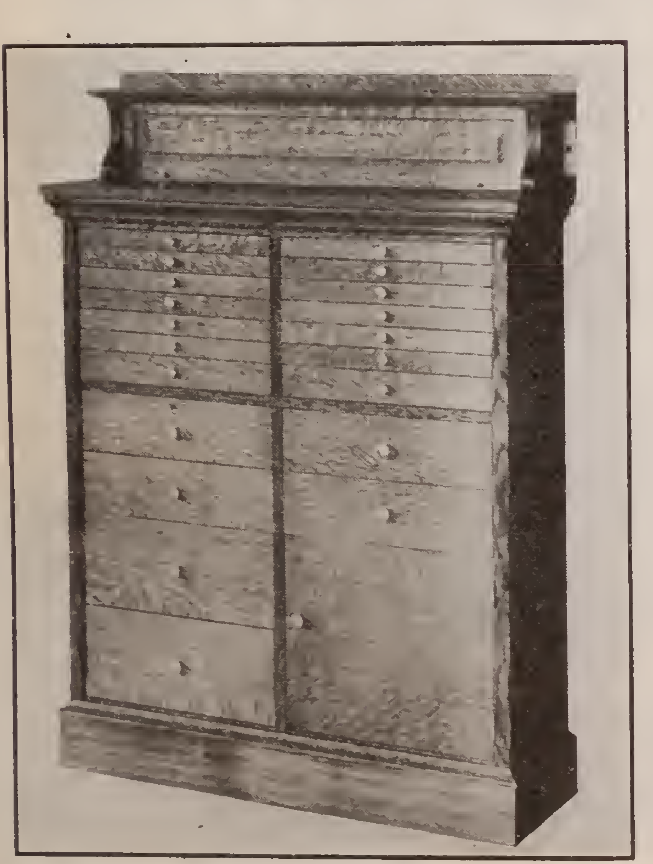

Fig. 9—Cabinet.

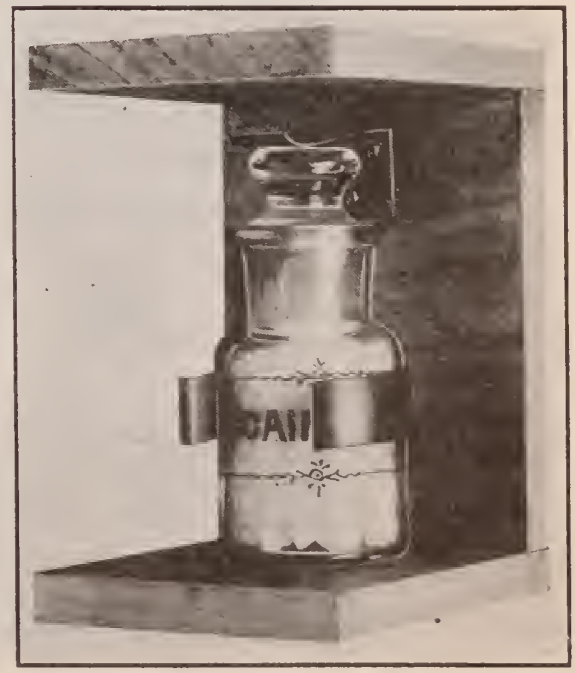

Fig. 10—Bottle holder.

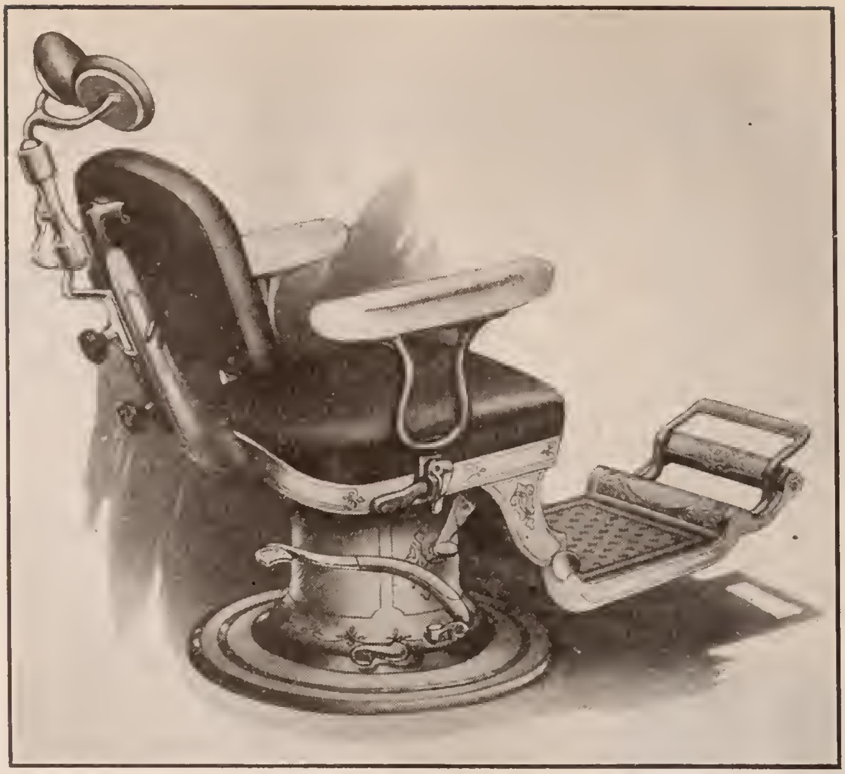

Fig. 11—Harvard chair.

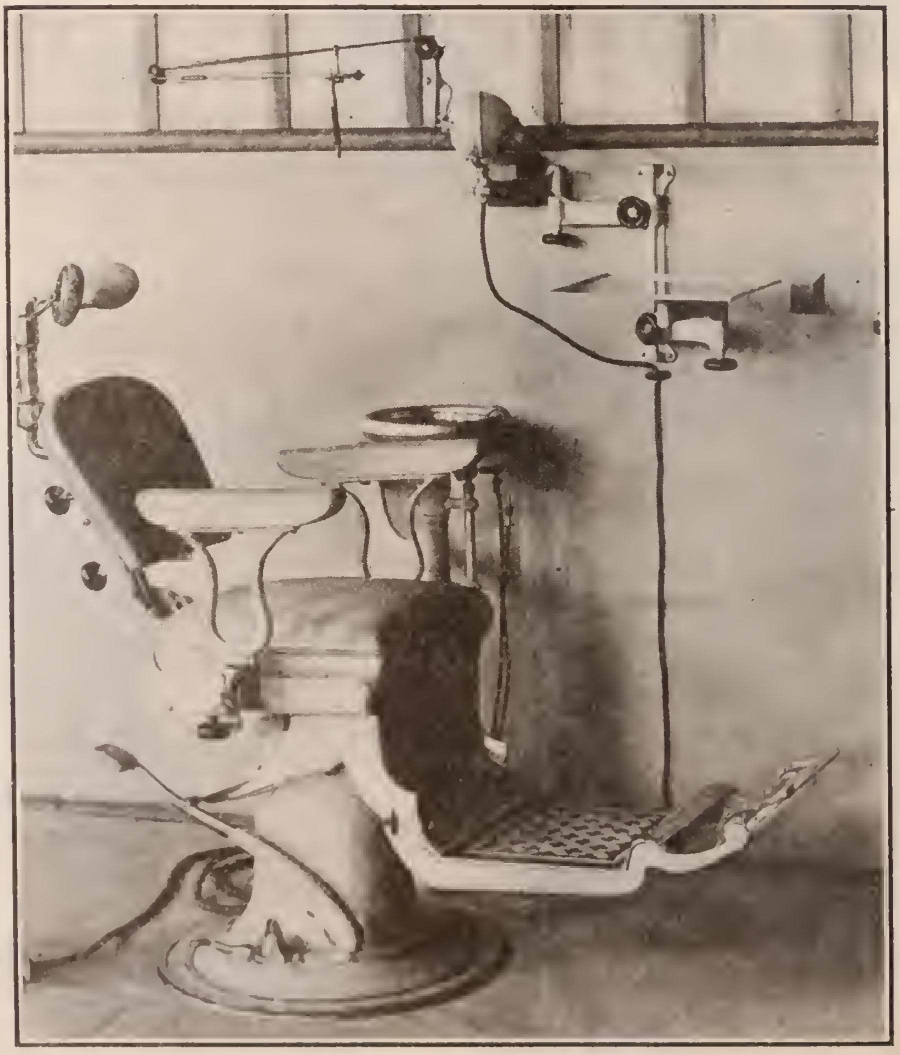

Fig. 12—Equipment in position.

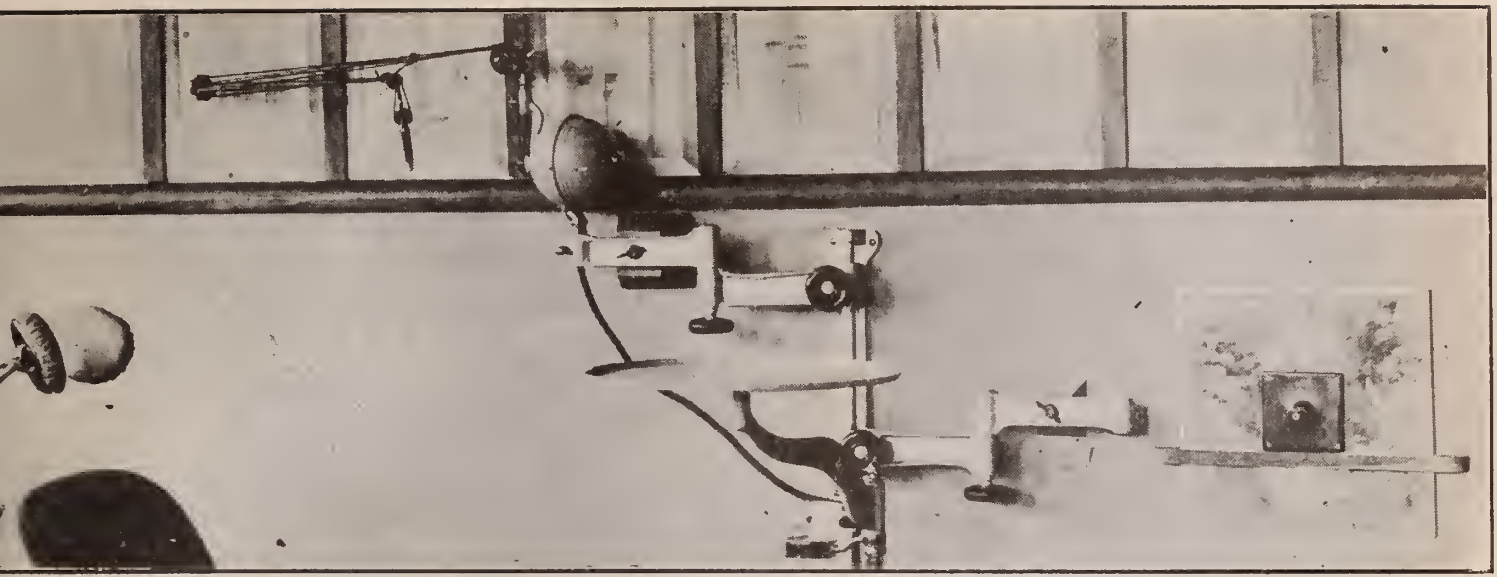

Fig. 13—Ready for transportation.

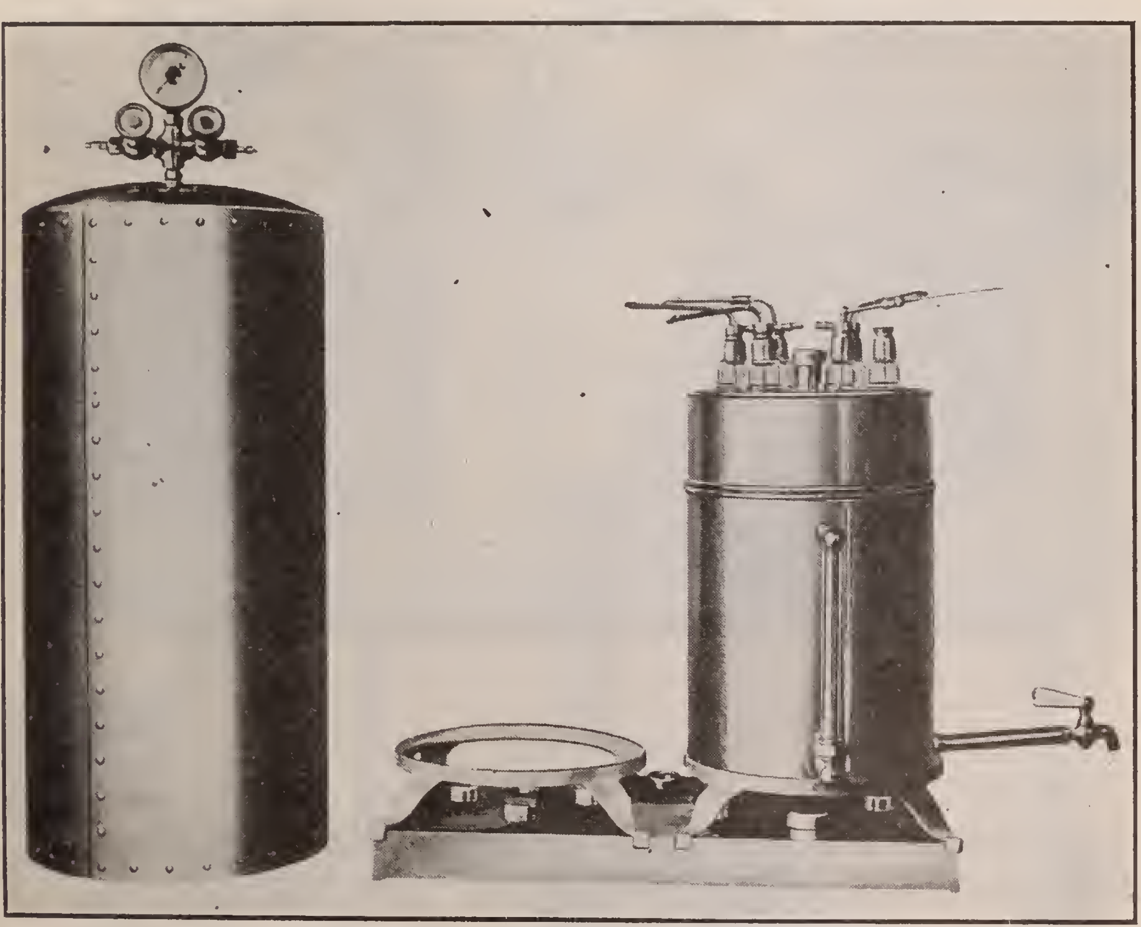

Fig. 14—Compressed air tank and alcohol stove.

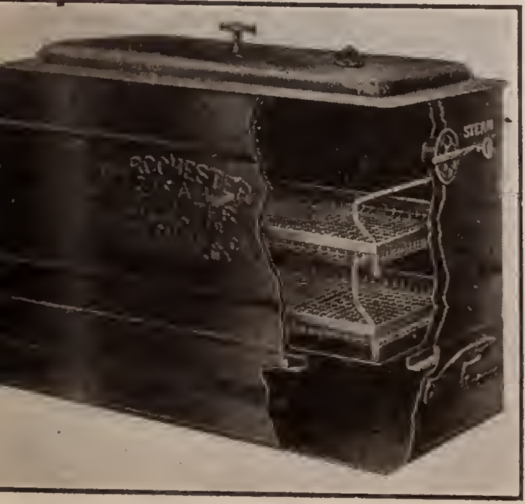

Fig. 15—Sterilizer.

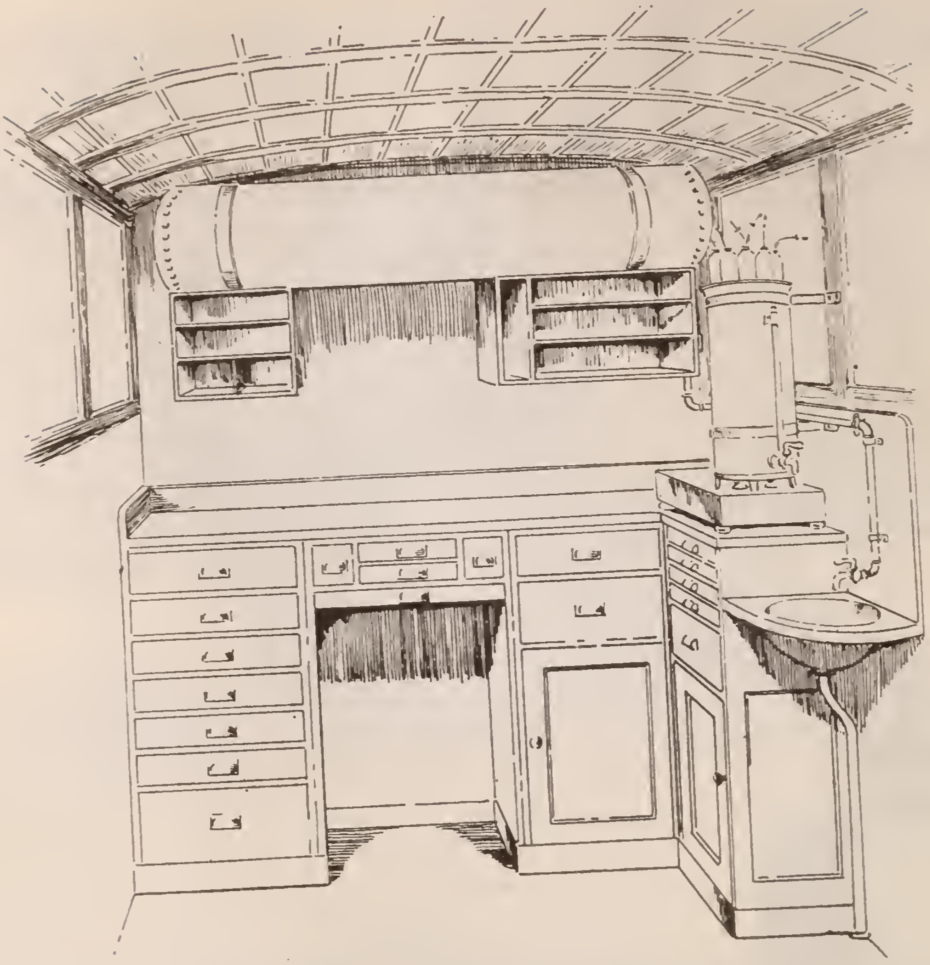

Fig. 16—Interior view, front.

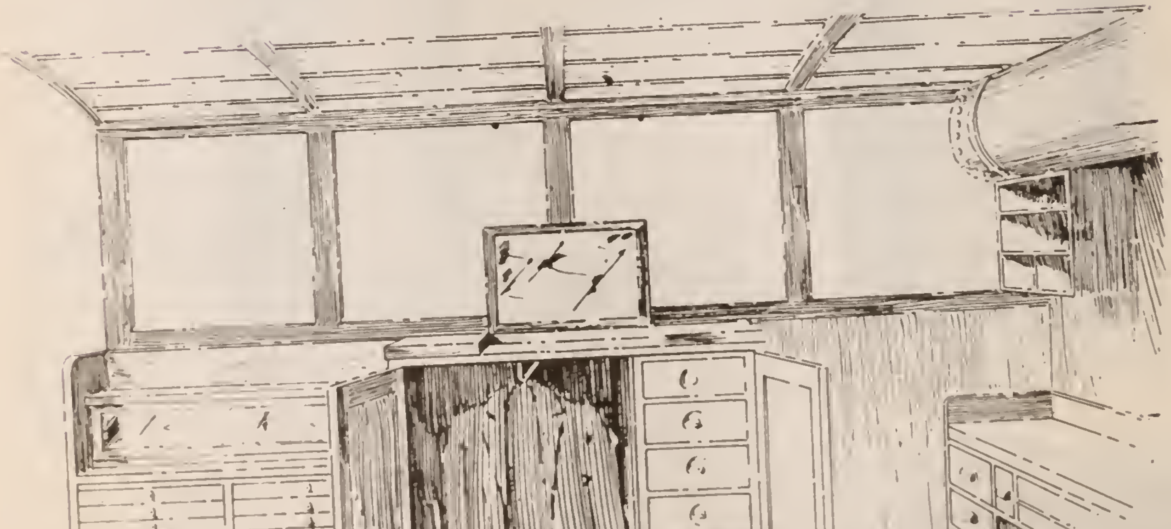

Fig. 17—Side view, showing instrument cabinet.

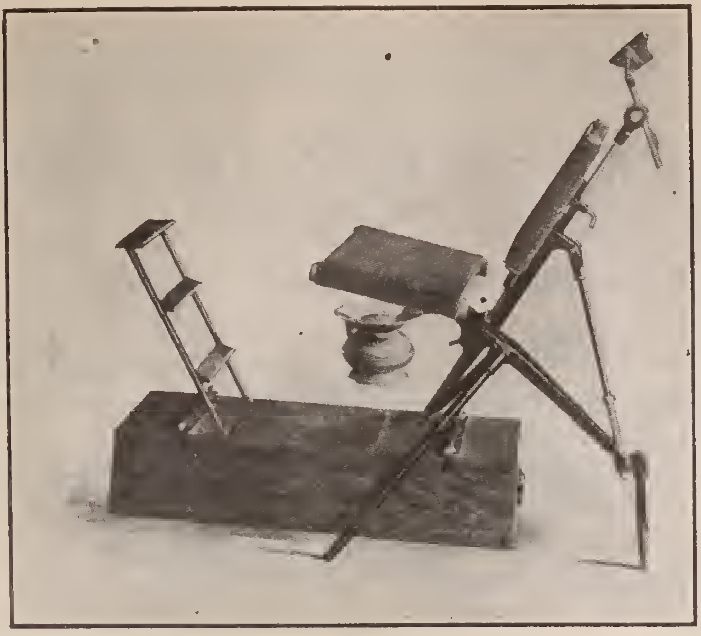

Fig. 18—Portable chair.

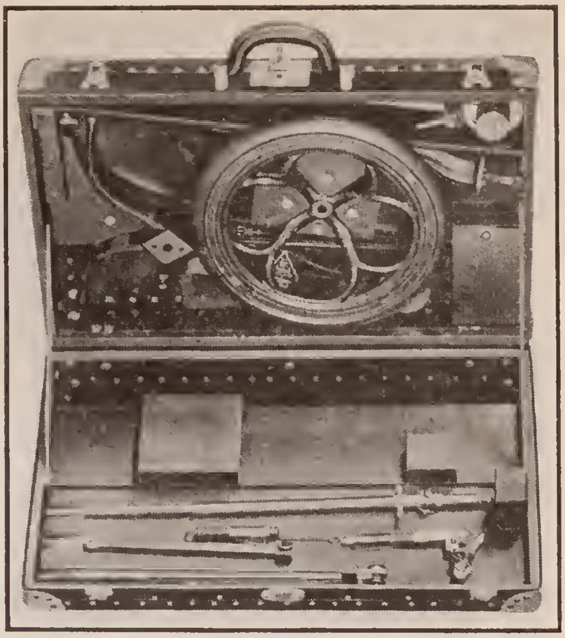

Fig. 19—Cleveland dental portable engine.

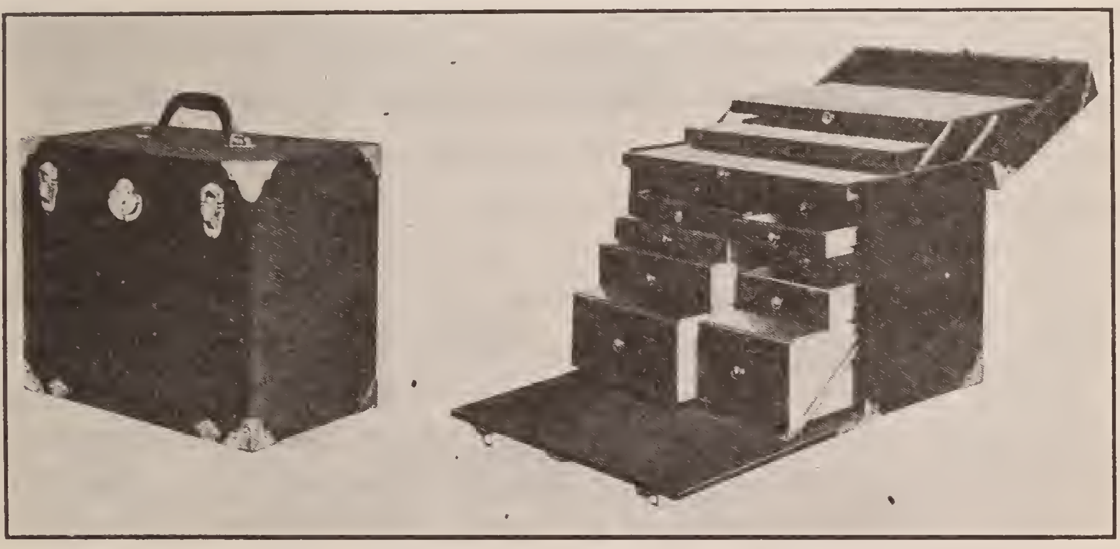

Fig. 20—Northwestern students' case.

covering of heavy duck oiled and painted with a water-proof paint. All panel work is made of agasote, which is water-proof and will not change in any weather condition. The tent fabric is composed of a very heavy duck, treated with a water-proofing. The floor of the tent will be made out of 1-inch pine slats resting on four wooden sleepers, said slats fastened together by strips of heavy webbing screwed on top. This makes it possible to roll the floor up in sections the same as a rug and place it inside of the car when in transit. The entire bottom of the car will be covered with battleship linoleum before any of the equipment is in place. All the equipment will be fastened securely to body, but at the same time in such a way that it can be taken out by the simple removal of some screws. The lighting of said equipment will be done from Prest-o-Lite tanks. The heating of the car, when necessary, will be done with an oil stove. The car is to carry four dentists and a driver.

CONSIDERATIONS OF PROBLEMS FREQUENTLY ARISING IN CONNECTION WITH CASES OF EXODONTIA*

BY J. P. HENAHAN, D.D.S., CLEVELAND, OHIO

I MIGHT DRAW attention at the outset to the fact that the operation of extraction, although the oldest dental operation, still remains the least understood, for want of greater study. Its status in the eyes of the laity is not improved for the reason that the average man who performs it makes no effort to bring this improvement about. He sits back and acts as though a good joke had been sprung when someone says he wants a tooth yanked.

For ages this operation was considered the fit occupation of blacksmiths, barbers, shoemakers, or anyone who possessed the necessary pair of pincers. Following that, the efforts of the dental operator were performed by the use of some crude weapon resembling a screwdriver of today, or a pelican or turnkey, which operate something on the order of a Stilson wrench.

It is useless to refer to the histories dealing with this subject, but we must all draw the conclusion that as a whole, extraction was a barbarous procedure, and we can readily understand that as a result of this kind of thing occurring in one generation after another, why it is not to be wondered that the average human is the hereditary possessor of a fear of this operation which usually is out of all proportion to other things. Notwithstanding all this we must admit that many dentists today perform this operation, in spite of the lack of technic, rather than with the aid of it. We see a man equip his office at the beginning of his career, with certain standard extracting instruments, and then for the rest of his life he performs all extractions with these, regardless of whether or not the case is unusual or whether or not the instruments are such that the best results may be attained by their use.

We find many dentists measure their success entirely by the fact that the tooth was or was not removed, paying no attention whatever to the condition in which the other tissues were left.

In my opinion this operation is in many instances of the greatest importance, deserving consideration in the same manner as any other surgical procedure, for the reasons that success is hoped to produce important curative results and failure may be the cause of great injury to the patient.

The operation of extraction should always be divided into two parts:

First, That of loosening the tooth.

Second, That of removing the tooth from the alveolus.

This should always be the course of procedure no matter what tooth or type of tooth is to be removed. The reason for this is obvious: If the tooth is one which can be removed easily and without danger to itself or the surrounding tissues, it will cost no extra time in proceeding as advised. If, on the other hand, the tooth be one of abnormal shape, or is in an abnormal position, it is also evident that great danger of accident exists before the tooth is removed. Unfortunately we seldom are certain that a tooth is normal or otherwise in outline or development until the tooth is out. This is the fact which makes it advisable that we follow any plan which will help in the least toward greater success.

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*Read before the Northwestern Ohio Dental Society, at Findlay, Ohio, Oct. 9, 1917.

These principles are followed in all scientific extraction operations from the removal of a lateral to the most difficult impaction, the difference being only in degree.

Of course, if all teeth were normal in shape and position there would be but little need for exodontists, but such is not the case, and all of us are called upon at times to do for or direct our patients to do that which is best for them, because we find that some extraordinary or abnormal condition exists.

The anomolies which we see in regard to teeth are of two general classes:

First, Those teeth which are malposed.

Second, Those which are malformed.

We see a great many cases which combine the characteristics of both classes.

In the first class we see impacted teeth, lower thirds especially, and upper cuspids. This class of cases very often is complicated by some abnormality of shape of the tooth caused by the force of eruption in its vain effort to force the tooth to its proper place. Or, we see the impacted tooth not only distorted in shape but also excementosed.

In the second class of cases we see teeth which on account of some stimulation of the peridental membrane, due either to infection or pressure, the roots have been excessively developed until all normal outline is lost and we have a condition of excementosis.

Not all excementosed teeth are difficult to extract, for the reason that the development of the excementosis is attended by a relative recession of the bony walls of the alveolus; the walls become thin and are carried away with the excementosis, leaving, however, an irregular wound which is always likely to be the seat of primary or secondary hemorrhage, and affording increased likelihood of infection.

A description of the anomolies of teeth would be limitless, so we will attempt to describe only a few types.

As presenting problems of extraction there are many types of teeth which are more difficult to remove than impacted teeth. We may resort to every device which we know of today, intended to throw light upon the outline and character of the tooth to be removed, but in spite of all this a great deal of uncertainty still exists in attempting to extract some teeth.

Take, for instance, a lower sixth-year molar in the mouth of a person thirty years of age. (*Fig. 1*) This tooth has not been causing pain but an X-ray reveals the fact that this tooth is the seat of a chronic abscess. The picture shows the tooth to be excementosed; possibly in turn resorbed to some extent; the tooth is firm to the touch. The history of the tooth has been devitalization at an early age, say approximately fifteen years ago or more, which means that the tooth was devitalized before it ever was thoroughly developed. Its texture at that time was not dense; it is not dense now, but it has in all these years dried out and has become exceedingly brittle; no peridental membrane remains; it is like an impacted tooth, due to ankylosis. This type of tooth in many instances will present as great a problem for extraction as any type which I can draw to mind. If great care is not employed and definite technic followed, a very severe wound will remain, due to laceration.

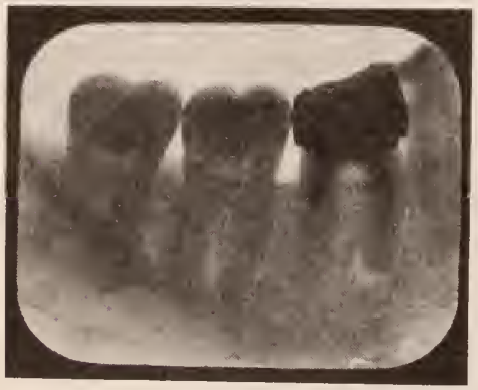


Fig. 1

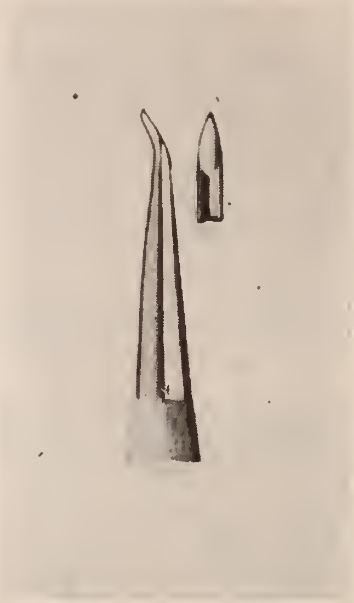


Fig. 2

Why is a tooth of this kind removed? Usually not at the instance of a dentist, but at the instance of a physician whose search for the cause of some general infection points to this tooth as a possible focus in the process of elimination.

A method for removing a tooth of this kind is to proceed at first in the usual manner; employ a molar forcep which will include between its beaks the entire body of the tooth. Care must be taken not to crush this tooth by pressure. Time must be employed in trying to loosen it; very often any amount of luxation will not produce the desired effect. The next step is to separate the roots. This may be done in any one of several ways, dependent more or less upon the condition in which we have the patient, that is to say, whether the patient has any anesthetic at all, whether the anesthetic is local or whether the anesthetic is general. In severe cases, and I consider this a severe case, I prefer to operate under a general anesthetic.

The method which I follow as a rule is to use a pointed elevator which works on the principle of a hand drill. (*Fig. 2*) This is introduced at a point between the roots and a slow rotary pressure is exerted inward and downward. This has the effect of removing the septum of bone between the roots. In effect this completes the first step, that of loosening. If the anesthetic should be local instead of general, consideration must be given to the fact that the patient is conscious and in order that fear and psychic shock shall be eliminated we must pursue milder methods to produce the same result. A drill used in the handpiece may be employed to cut away this bone. It may be very carefully done in this manner for the reason that the anesthetic prevents pain. Occasionally the elevator will remove one or the other of the roots; if, however, neither root is removed, we proceed to the next step. We introduce a flat wedge-shaped elevator (*Fig. 3*) into this space and force it down through the bony structure and between the roots and when the proper depth has been reached a slow rotary motion is employed to lift up, usually the distal root first. When this is accomplished the elevator is placed between the bicuspid and the mesial root which still remains and with the pressure of the thumb of one hand and the finger of the other, the elevator is slowly worked down between the two teeth, being careful not to encroach upon the tooth not to be extracted. This will result in the mesial root being forced backward into the space where the septum had been.

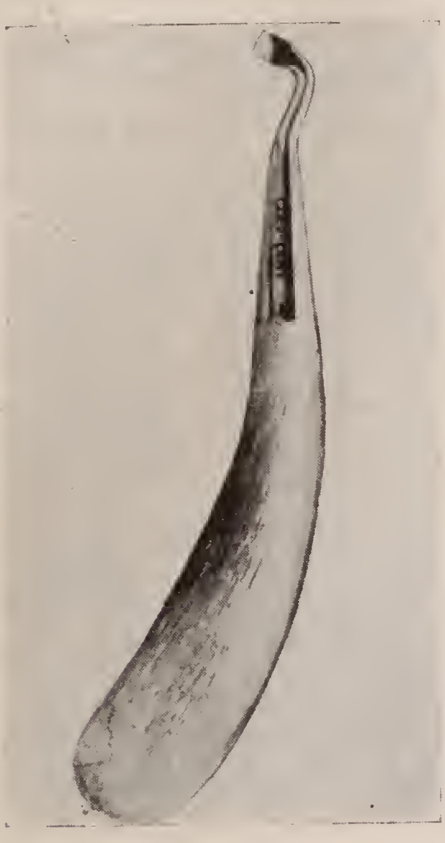


Fig. 3

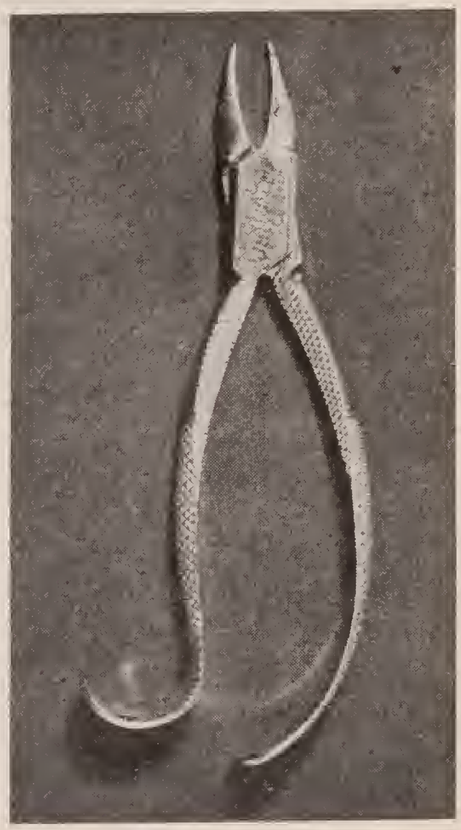


Fig. 4

Removal of a superior, lateral, central or cuspid root which has been hollowed out in preparation for a Logan or any other post attachment crown, will often present a great deal of a problem. If care is not taken a great gash may result in the alveolus, which, when the process of healing is complete, will show a deep depression. The method of removing these teeth is not to pull them out. This cannot be done; the nature of the root, which is only a shell, will not permit of any pressure from a pair of forceps. Therefore, some other method must be employed. The simplest method, and the quickest, is to employ a specially-prepared pair of forceps. In my equipment I have a pair, the beaks of which have been ground down to such an extent that a very slight pressure would be sufficient to break them. (*Fig. 4*) However, I have been using this pair of forceps for several years without injury. My method is to employ them as a double elevator. They are placed at the cervical margin, being careful to exclude the soft tissue, and gradually rotate and force them in the direction of the apex. This is kept up until the root is felt to pop between the blades. If this method should not be all that is necessary, a central elevator may be employed. (*Fig. 5*) This instrument consists of a straight shaft, curved and concaved at the end, and of sufficient width to permit it to be introduced into any incisor socket. I cannot imagine how any one could fail to remove a root with this instrument, if ordinary mechanical ingenuity is employed.

The upper first bicuspid often is bifurcated and the roots describe such curves that it is impossible to remove both roots together. The remaining root is usually very small and very uncertain as far as location is concerned. The method of removing this may be the same as for the incisor root, but a drill may be employed. It may be inserted in the socket of the root which has been removed and pressure brought to bear in the direction of the one in place. A small straight enameled chisel very often is all that is necessary to complete this operation. If the root should be loosened and lost under the soft tissues in the apex region, an incision through the gums over the root will permit its being removed through the side. This reduces instrumentation, saves time and prevents injury or loss of tissues.

A lower bicuspid, crowded lingually, the other teeth taking up all available space, may be a very difficult case for extraction. Usually this tooth should be approached with the utmost care, for if it is a problem while the crown still remains intact, it will be a hundred times a greater problem with the crown broken off. For these cases I advise the use of a pair of forceps applied in just the opposite direction to that which would be used if the tooth were in normal position; slow rotation is the only method employed. If the tooth cannot be loosened, or if the crown should be broken off, the next step is to drill through the process from the buccal side between the roots of the normal bicuspid and molar; when we have reached the root of the bicuspid to be removed, we enlarge this drill hole to permit of the insertion of an instrument which will be used as an elevator. This elevator will usually be one of special design for the special case. It should be strong and straight. Its point should be sharpened and should be inserted in such a way that it may be employed like a small crowbar. The process of the jaw will be the fulcrum; the force will be transmitted to the root. Unless the root is excementosed or has some excessive curve, it will be loosened and probably lifted out.

The case of the upper sixth-year molar, the tooth all hollowed out and the roots very brittle. In an attempt to extract, one or the other root is forced into the antrum. This root may have been the very cause of the trouble which required the extraction of the tooth. If it is allowed to stay in the antrum it will be the cause of an infection as long as it is present. Its removal requires that a sufficient opening be made into the antrum through the socket to permit of its being washed out. This opening may be made with curettes or it may be made with a large surgical drill; the opening should be as large as a lead pencil or more. A jet of lukewarm salt water is then introduced into the antrum and allowed to flow in such a way that the root is washed out either through the nose or through the alveolus. Sometimes the root may be lodged between the mucous membrane and the bony wall of the antrum. If such is the case, it must be probed for with properly-fashioned instruments.

A lower central or lateral root, submerged below the soft tissues, the crowns of the remaining teeth having closed in. A situation of this kind prevents the use of the forceps for fear of destroying other teeth. In this case a small incision is made in the gum tissue close to the apex of the tooth. If the operator sees fit he may create a small opening with a fissure bur or he may introduce a sharp elevator directly through the process plate. A small amount of rotation is all that will be necessary to lift this root out. The soft tissues close over and in twenty-four hours it would be hard to see where the incision had been made.

AN IMPACTED UPPER CUSPID. (*Figs. 6 and 7*)

Incise in a line along the palate from the lateral tooth to a point between the second bicuspid and first molar. A blunt retractor may be inserted in the incision and the soft tissues lifted from the bone. In a great many cases this single incision will suffice but in some cases an additional incision will be necessary. This incision is to be made from a point beginning at the lateral tooth and joining the original incision continued upward and backward along the palate alongside of the median line. Great care must be used not to make the incision too close to the median line because the blood vessels which reach the palate through the incisive foramen may be severed, resulting in a hemorrhage which is very difficult to control and which makes the operation a great deal more difficult on account of the blood. This makes a three-cornered incision and will expose the bone; very often the crown of the tooth may be seen protruding at some point; in others simply an elevation of the bone will be seen conforming to the crown. In other cases no indication whatever is given on the surface which will help us to locate the impacted tooth. In this case we must proceed entirely according to our X-ray pictures.

The crown of the tooth is exposed; we follow the outline of the root and enlarge the socket so that the tooth may be moved therein. Continual effort along this line will shape the socket in such a way that the crown end will be lifted up so that it may be removed.

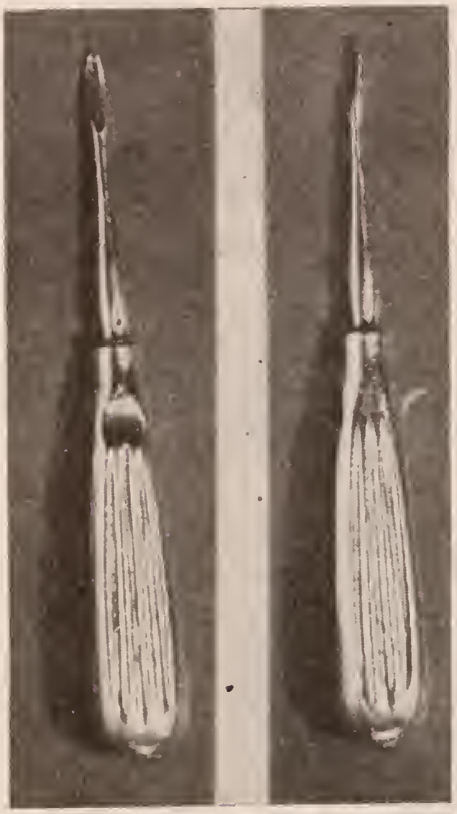


Fig. 5

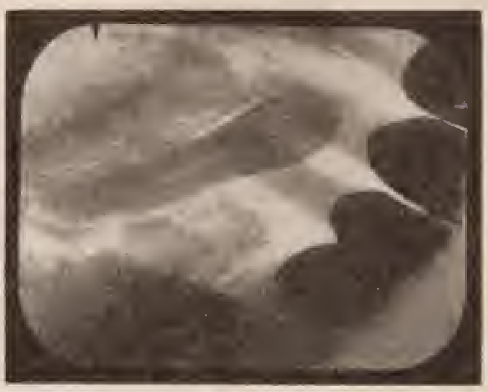


Fig. 6

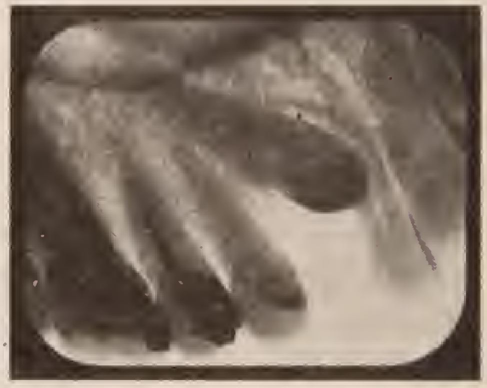


Fig. 7

The technic for the removal of an impacted lower third molar in principle is the same as for the removal of an impacted cuspid. (*Figs. 8 and 9*) The soft tissues are retracted exposing the bone. Then a small drill is employed to enlarge the socket. This drill is not a bur. Burs are not indicated because they cut too much on the side and tend to entangle the soft tissues. The principle is to insert this drill along the axis of the root of the tooth, removing the drill and inserting it again slightly to the side. When this is done the two canals are joined. This process is followed until the socket is enlarged

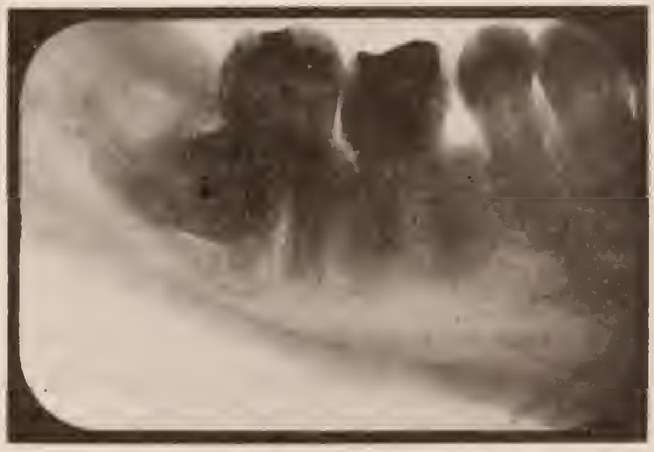


Fig. 8

around the tooth for two-thirds of its circumference. When the tooth is loosened if the socket is not large enough to permit of its removal, it is allowed to fall back into the socket and a larger bur or surgical drill is employed to remove still more of the bone. In this way the outer shell of the bone and the periosteum are not injured. When sufficiently prepared, an elevator is inserted under tooth to lift it up.

The third molar, in the various conditions in which we observe it, presents great problems for extraction. The shape and location of this tooth usually contra-indicate the use of the forceps; at any rate the regular molar forceps. This tooth is best removed by the use of the elevator. A great majority of these teeth will be removed quickly and easily by simply introducing the proper instrument between the bone and root of the tooth to be removed. (*Figs. 11 and 12*) A slight motion of the elevator is usually all that is necessary to unwind this tooth from the socket, upward and backward, due to the curve of the root. (*Fig. 10*) The third molar very seldom can be removed either buccally or lingually as is the case with the second and first molar. The principle will be the same whether the tooth is in normal position or is partly erupted or perhaps entirely unerupted. The same principle is employed in a greater degree when removing an impacted third molar either before or following a preparation of the bone.

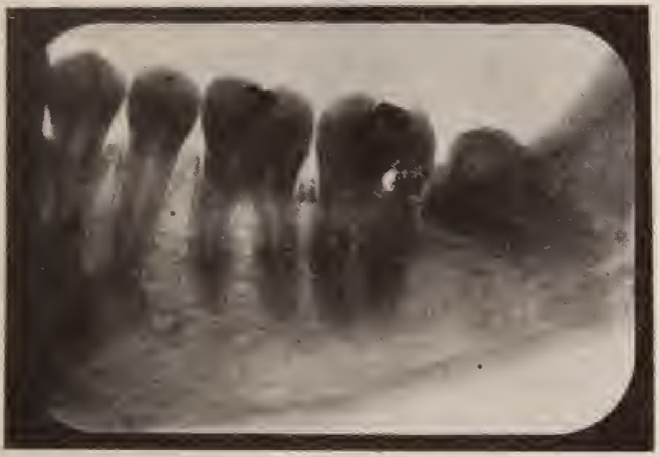


Fig. 9

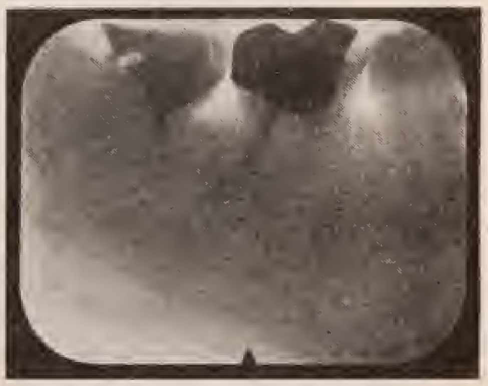


Fig. 10

AFTER PAIN

Pain following extraction is usually due to the fact that the socket contains no blood clot. This usually results in sockets where the normal outline has been destroyed. It is seldom that the clot will remain in an injured socket. Without the protection of the clot the socket becomes infected and pain results in a few days if it has not persisted since the time of operation. Dry socket occurs also as the result of the use of peroxid of hydrogen. The action of this preparation destroys the clot and it becomes infected or falls entirely out of the socket.

The treatment of these cases is to cleanse the socket and apply some agent which will be both antiseptic and anodyne. A good rule to follow is to apply this treatment to all sockets where a difficult extraction has been made. The remedy which I employ consists of a combination of chlorotone and essential oils which is put up by Parke-Davis under the name of Dentalone. This remedy proves very efficacious. The chlorotone is both antiseptic and anodyne and the pain is quickly controlled. The essential oils prevent the dressing from becoming foul in a short time, as is the characteristic of most dressings which are employed. Twenty-four hours is not too long and even forty-eight hours will bring the patient back, the dressing still retaining the odor of the essential oils.

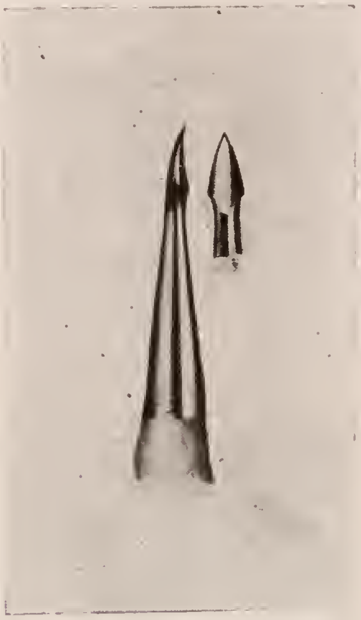


Fig. 11

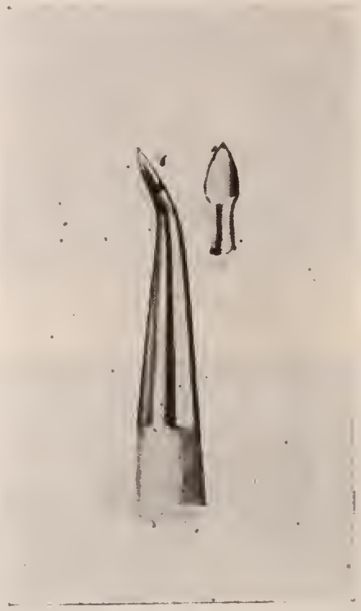


Fig. 12

Hemorrhage following extraction may be termed according to its characteristic, as arterial or venous. The terms explain the character. It may be generally termed as primary or secondary. Primary hemorrhage, as the term applies, follows immediately after extraction. It usually is due to laceration of the soft tissues. It may be the result of the removal of a tooth which has been the seat of a chronic abscess. This is more likely to be noticed in the lower third molar than elsewhere, although the upper six and twelve-year molars very often are the point where these hemorrhages occur.

Secondary hemorrhage is that which may occur any time subsequent to extraction, beginning a few hours to several weeks after the tooth has been removed. In these cases a history of some systemic disturbance usually can be found. A rise in blood pressure always accompanies this condition and usually they occur in the evening or the early part of the night.

A hemorrhage may be dangerous to life if the hemorrhage is profuse. A very slow hemorrhage, while it should have attention at the earliest possible moment, is not particularly dangerous. It has been said that the loss of a small amount of blood in a very short time is much more dangerous than the loss of a great quantity of blood over a protracted period. The sudden changes in arterial tension is responsible for this.

The treatment of hemorrhage depends upon the character of the blood. If the hemorrhage is due to the fact that the patient is a hemophiliac, the most advisable procedure for a dentist is to call for the aid of a physician as soon as possible, in the meantime resorting to every possible means to stop the loss of blood. In this case the blood will not clot due to the lack of fibrin ferment, a substance naturally existing in the blood, which causes coagulation.

The treatment for this condition is systemic as well as local. Systemic treatment consists of the introduction into the blood stream of various agents which will produce coagulation properties in the blood.

It has been found that fresh blood or blood serum injected will produce this effect. A substitute for this is a preparation known as coagulose (Parke, Davis & Co.). It is a powder produced by precipitating normal blood serum, and which, unlike normal blood serum, retains these properties for a long time. It is dispensed in glass bulbs in measured doses.

For hemorrhage resulting from injury or a rise in blood pressure, the proper method is to cleanse the socket of all blood clot and wash it carefully with a saline solution and then insert an iron solution. For years Monsell's solution was the standby of all dentists for this purpose; recently a more desirable remedy has been introduced. It is known as Ferropyrin Merck, a compound of antipyrine and ferric chlorid. It is an orange-red powder which may be dissolved in water. It is a powerful hemostatic. The antipyrine also acts as an analgesic, a very desirable property in these cases which usually are characterized by pain. The method of employing this, or any other agent, is to introduce a large number of small pledgets saturated in this solution. Each pledget is about the size of a pea. They are introduced until a sufficiently large plug is contained in the socket; then pressure is applied which condenses the whole mass. It is carefully observed for a few moments and if, as usually is the case, a small globule of blood forces itself out at some point, another small pledget is introduced and pressure again asserted. This procedure is followed until the bleeding has been entirely controlled.

Hemorrhage may result from all sockets at the same time where many teeth have been removed. I have seen cases so bad that a plaster Paris impression was necessary to be made and allowed to remain in position over night.

MISTAKES WHICH MAY OCCUR

In attempting to extract the upper third molar occasionally the second molar is removed by mistake. This is very liable to occur unless great care is exercised. The way to prevent this is to examine the case carefully before operating and when the forceps are being applied to count the molars. This is the only safe rule to follow to prevent this grievous mistake from occurring sometimes.

A difficult case is that wherein the patient presents for the removal of a lower third molar. The face is swollen and the jaws are almost closed; the breath is foul and the teeth are in need of cleansing for lack of care, sometimes extending over a period of many days. The opening of the mouth to allow for examination and operation is nearly as difficult as the removal of the tooth itself. It is about necessary that a general anesthetic be administered in all these cases. Before proceeding with the anesthetic, if at all possible, a small wedge (even as much as a quarter of an inch) should be inserted between the molars or bicuspids. If this is done it will save a great deal of time and a great deal of trouble after the patient is anesthetized. When anesthesia is complete one of several instruments designed for the opening of the mouth may be employed. The opening of the jaws must be very slowly accomplished not only on account of the danger to the teeth but on account of the anesthetic. The jaws should be forced open at the rate of about a quarter of an inch every few seconds. Very often the simple opening of the mouth will cause a great gush of pus from around impacted or unerupted teeth. As a rule the tooth which is the cause of the trouble should be removed, the alveolus providing the avenue for drainage.

1023 Rose Bldg.

The Rights of Dentists to Administer Anesthetics

An opinion of special interest to dentists throughout Ohio has been handed down by Attorney General McGhee at the request of Dr. W. I. Jones, of the State Health Council, who had requested it to clear up a very general misunderstanding.

In his opinion, Mr. McGhee holds that dentists who hold proper certificates are entitled to administer anesthetics both in the practice of dentistry and otherwise as occasion may arise.

Some time ago an opinion, which was popularly construed to confine such service to doctors of medicine, was given out.

To quote all the law bearing on the subject, Attorney General McGhee says: "I advise you that a person who has a certificate to practice dentistry in the state of Ohio is permitted to administer anesthetics, not only in the exclusive practice of dentistry, but also when otherwise properly required to do so.

"In Opinion No. 528, rendered by me on August 14, 1917, I held that the giving of the various drugs to produce anesthesia, when surgical operations are being performed, constitutes the practice of medicine under the provisions of the medical laws of this state and therefore could not be given by persons not admitted to the practice of medicine, but the question raised in this opinion as to the exemption of a dentist was not before me and was not answered in that Opinion."

TO EVERY AMERICAN DENTIST

BY J. W. BEACH, PRESIDENT, BUFFALO, N. Y.

President Wilson has asked that every resource for winning the war be utilized to the very limit. The dental profession forms one of the greatest resources for making our army efficient. You are an integral part of this great source of help to your country. Will you meet this responsibility as an American citizen should? Of course you will!

HOW CAN IT BEST BE DONE?

By joining the Preparedness League of American Dentists *now* and assisting in its great work. Ten thousand new members are needed right away. If you are already a member we ask you to get at least five more just as soon as possible. The mouths of the men in our new national army must be made healthy and dentally fit before they go to cantonments and we must help to the limit of our ability.

The Preparedness League of American Dentists is a recognized agency for carrying on this work under the direction of the Surgeon General's office of the War Department, the National Dental Association and the Committee on Dentistry, Sub-Committee of the Council of National Defense.

There are forty-five thousand dentists in the United States. Six thousand belong to the league and have done the major part of the following work: July 16 to November 3, 1917, 60,946 fillings, 35,909 extractions, 2,233 cleanings, 133 crowns, 184 bridges, 165 plates, 6,891 unclassified operations; total, 111,061. Thousands of operations not listed were performed prior to and since these dates.

If every one of the 45,000 had done his part, what a splendid showing we could have made. It is not too late to become a part of this great work for increasing the fighting power of our army. We know you are with us.

Don't let the Germans show all the efficiency, let's show what we can do.

We've got to work together to win this war; do your part by joining the League *today*, and we will give you real, properly-directed work to do. For membership send one dollar ($1.00) payable but once, to the Preparedness League of American Dentists, 131 Allen street, Buffalo, N. Y. Kindly enclose your business card to avoid mistakes in name and address.

ORAL SURGERY
CASE REPORTS

CONDUCTED BY HUGH W. MacMILLAN, D. D. S., CINCINNATI, OHIO

THIS DEPARTMENT AIMS TO REPORT INTERESTING ORAL SURGERY CASES IN BRIEF FORM, ILLUSTRATED BY RADIOGRAPHS AND PHOTOGRAPHS WHERE POSSIBLE. ARTICLES FOR THIS DEPARTMENT MUST NOT BE MORE THAN 500 WORDS IN LENGTH. SEND CONTRIBUTIONS TO DR. HUGH W. MACMILLAN, UNION CENTRAL BUILDING, CINCINNATI, OHIO.

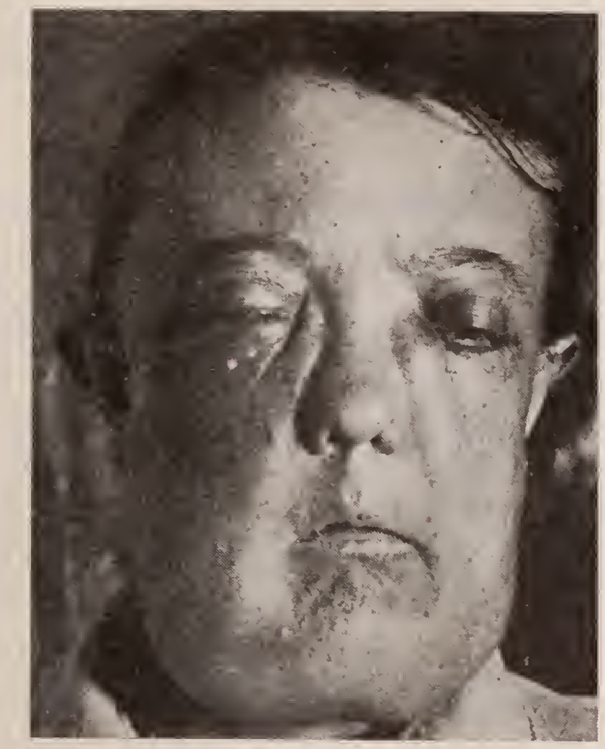
Case I: Leontiasis ossea. Mrs. J. J., age 36, complained of ulcerating jaw. Examination revealed orbital cellulitis and antrum infection.

X-ray report: "Stereoscopic plates show tremendous bone sclerosis and enlargement involving the anterior half of the skull and both upper and lower jaws. The plates suggest leontiasis ossium."

Case I—Fig. 1

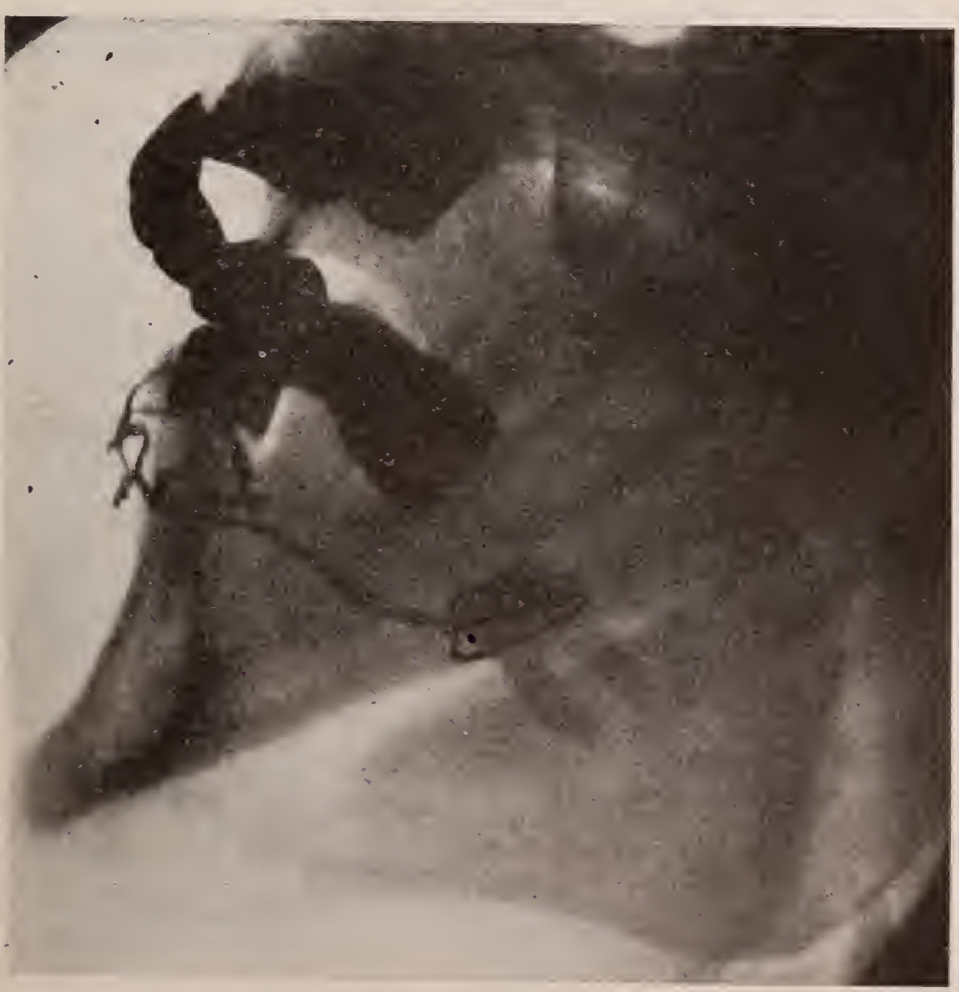
Case is presented as one being very unusual. Patient discharged improved.

Case II: Pathological fracture. J. W., age 46, was suffering from badly-swollen jaw. He went to his dentist who extracted a tooth and told him to return for treatment. Patient failed to return. When patient came to me he presented an indurated swelling along lower border of left lower jaw extending down into the neck. Several fistulæ were discharging into the mouth. Probing revealed several pieces of detached necrosed bone which were removed by pliers, using no anesthetic. Fracture of body of jaw present, so teeth were wired temporarily as in X-ray. Hot applications applied externally. Later several



Case II—Fig. 1

more pieces of bone were removed and patient made uneventful recovery. Dakin solution used in packing, irrigating and for mouth wash.



Case II—Fig. 2

(Cases reported by Dr. Hugh W. MacMillan.)

EDITORIAL

AID NEEDED FOR DISTRESSED DENTISTS ABROAD

In the July SUMMARY, 1916, we published an editorial directing attention to an organization called *l'Aide Confraternelle,* which was founded in Paris in March, 1915, to aid French and other dentists who were war sufferers. By April, 1916, French dentists alone had contributed 50,000 francs ($10,000), and other subscriptions had been made by English, Canadian, Spanish and Italian dentists. Nothing had been solicited from American dentists until the dental journals of America were asked, in 1916, to make an appeal for funds from this country. This was done, but the response was meager.

The aid already given by this benevolent organization has greatly depleted the fund accumulated and a greater fund is sorely needed. We are now in the war ourselves. It is our war as well as that of the Allies. It is the duty of every American citizen to help in the war, if not by enlisting by contributing, and an especial duty for American dentists to aid their brother dentists who are sufferers from the war. Throughout Belgian and French territory devastated by the war, dentists as well as people in general have had all their possessions swept away. There are many homeless, dependent families of dentists who have been mobilized or killed, and dentists in civil life whose means of livelihood have been taken away and who are in dire need. The fund in part is for aid of all such suffering dentists and their families during the war. And further, by its charter from the French government, the l'Aide Confraternelle organization is to be continued for a period of five years after the conclusion of the war in order to facilitate the return to normal life of all colleagues severely injured by the war, by giving to them or advancing as an honorable debt the necessary means to re-establish themselves, and in the invaded districts to help in the reconstruction of destroyed homes and in newly equipping dental offices devastated by the enemy, so as to enable dentists to resume their practice.

This second appeal for aid should sink deeper into the heart of every American dentist than did the first appeal when we were not at war ourselves, and a prompt and generous response should be made. The American dentists can, without inconvenience, subscribe a most substantial sum for this most worthy cause and it is their duty to do so. There could be no greater reproach upon the dental profession of

America than to make but a niggardly contribution when the suffering is so acute and dentists and their families are in such dire need.

It is my duty, it is your duty, *it is the duty of every dentist,* to aid, and the response should be spontaneous and liberal. Let us make a fund for l'Aide Confraternelle that American dentists will not be ashamed of and let us make it without delay.

The members of l'Aide Confraternelle are the most illustrious dentists in all France, and every cent contributed will be used only for the relief of suffering dentists and their families.

Editors of dental periodicals in America have been asked to make this appeal and to act as receiving stations for contributions. THE DENTAL SUMMARY will acknowledge and forward any contributions to the fund sent to its editor, 195 Sixteenth Ave., Columbus, Ohio. Or, if the reader prefers to send his contribution direct to the treasurer of l'Aide Confraternelle, address M. Fontanel, 1 Rue Vercingetorix, Paris, France.

Do not delay! Send a contribution at once. It will take but a few moments to write a check. Do your duty and retain a clear conscience.

DENTISTRY IN THE CANTONMENTS

Dentists were so ready to respond to the call to service that the army quota has been filled for months and the dental surgeons were in the cantonments long before the unit equipment could be supplied by the government. We recently made a trip to Camp Sherman, Chillicothe, Ohio, and found the dental surgeons well, happy, well housed and clothed, doing all they could at that time without full equipment. Since then the equipment has arrived and is in place at the main hospital and the two temporary units located in different sections of the camp.

Two new unit buildings, for the dental surgeons, have been authorized for this camp, and will be built as soon as appropriation is available. Each unit will be two stories high with the upper floor for quarters and mess for the personnel. On the first floor will be a large operating infirmary with ten base equipments including dental chairs, cabinets, fountain cuspidors, electric engines and switchboards, and in fact, everything to make it as complete as possible. There also will be two individual operating rooms, an oral surgery room, an exodontia room and other rooms, such as waiting, office, record, laboratory, toilet, etc., which go to make up the unit. It will be complete in all details and a wonderful aid in concentrating the work.

At present there are forty-five dental surgeons at Camp Sherman, under the direction of Lieut. B. H. Sherrard, and they now have adequate equipment, both portable and base outfits, for all.

The oral surgery unit is now working on focal infections and abscessed conditions of the teeth. Soon they will have the assistance of three more men who have completed the special oral surgery course as given by the Washington University, Saint Louis, Northwestern University, Chicago, and University of Pennsylvania, Philadelphia.

Oral hygiene slides of the state dental society are being shown and illustrated lectures being given to the soldiers. Special lectures are being given from time to time to the dental surgeons of the camp by men prominent in the dental profession who are specializing in some branch of dentistry.

There are between 30,000 and 40,000 men in camp, and all regiments have been inspected. Those men whose teeth are in the worst condition are being cared for first. During October, with only partial equipment, the dental surgeons operated for 1304 patients. Following is a summary of cases: 20 non-erupted, painful teeth; 78 gingivitis, acute; 437 acute pulpitis; 19 Vincent's angina; 229 alloy fillings were inserted, 152 oxyphosphate fillings, 63 roots filled, 19 crowns reset, 11 bridges reset, 441 extractions, 32 conductive anesthesias (incomplete report), all of which required 2,245 sittings. This was the work of about twelve dentists, the average being about 100 patients per dentist per month, not counting repeated visits of the same patient.

The following compose the personnel of the dental men in the camp: *Dental Corps*—B. H. Sherrard, H. E. Albaugh, R. M. Kisner, W. B. Caldwell, B. H. Dean, H. L. Hogan, W. A. Rose, E. K. Durbin. *Dental Reserve Corps*—E. B. Lodge, G. P. Bannister, P. S. Harner, H. W. Morrison, M. J. Damlos, L. J. Deger, L. W. Bentley, O. Keselring, W. F. Palmer, W. E. Park, F. F. Happy, F. A. Clear, E. D. Lowry, J. H. Reid, E. L. Markley, J. J. Miller, H. E. Schedine, H. D. Rand, G. W. Dierks, M. F. Gruber, R. M. Cope, J. D. Eby, R. B. Comstock, C. F. Berry, R. A. Buchman, H. S. Davis, R. F. Coleman, J. L. Crawford, E. J. Cobb, R. W. Osborne, P. L. Marshall, J. F. Hannon, J. F. Kemper, B. J. Light, W. A. Barton, S. E. Kay, R. G. Shepard, E. T. Foster.

It will repay those dentists who are within reasonable distances of the cantonments to visit them, and it will please the dental staff to have them do so. By visiting the camps dentists can give encouragement and support to these dental surgeons who are sacrificing so much to make a success of their new undertaking.

DENTISTS APPOINTED ON ARMY DRAFT BOARDS

By a government order given in December, to place dentists on the Army Draft Boards, the dental profession has received a new recognition. The dentists appointed will sit with other members of the Boards in an advisory capacity and have charge over all dental and mouth conditions of the applicants.

Governor Cox has recommended the following dentists for Draft Boards in Ohio: Akron Board, Dr. C. E. Smith; Ashtabula Board, Dr. H. M. Brown; Athens Board, Dr. L. G. Bean; Canton Board, Dr. J. H. Wible; Cincinnati Board No. 1, Dr. H. C. Matlack, Board No. 2, Dr. H. T. Smith; Cleveland Board No. 1, Dr. W. A. Price, No. 2, Dr. J. F. Stephan; Columbus Board, Dr. F. R. Chapman; Dayton Board, Dr. L. E. Custer; Lima Board, Dr. D. H. Sullivan; Lorain Board, Dr. J. E. Trombley; Mansfield Board, Dr. G. W. Kenson; Marietta Board, Dr. T. S. Ward; Portsmouth Board, Dr. G. H. Williamson; Springfield Board, Dr. H. J. Bosart; Stubenville Board, Dr. H. H. Erskine; Toledo Board No. 1, Dr. L. L. Barber, (if Toledo has two Boards, No. 2, Dr. C. C. Sherwood); Youngstown Board, Dr. W. H. Hayden; Zanesville Board, Dr. Frank L. Cary.

THE RECENT MEETING OF THE OHIO SATE DENTAL SOCIETY

The fifty-second annual meeting of the State Dental Society held in Cleveland, December 4, 5, 6, 1917, was one of the best attended meetings yet held. Much of value was given and the program committee and others who aided deserve great credit. About the only derogatory comments we heard were that the clinics, with few exceptions, were a repetition of the matter given in the Seminar, and that the exhibits were so scattered about the hotel that few dentists found their way around to every display. We are not saying this to criticise, but with the hope these things may be corrected another year.

The following recommendations by the president were adopted: That dues of members in active military service be paid by components.

That components having fifty members in good standing shall be entitled to a second member of the Board of Directors and one additional for each additional fifty members.

Creating the office of president elect.

Making the ad interim committee of the Board of Directors a standing committee.

Creating a committee on military dentistry.

Doings of the Board of Directors: Greetings were sent to Dr. A. F. Emminger, Los Angeles, Cal., on his 71st birthday anniversary, December 5th, this being the first meeting of the state society that the doctor has missed in fifty years. Greetings were also sent to ex-treasurer Dr. S. D. Ruggles, who is now in the Dental Reserve Corps.

Recommending to the society an amendment limiting the attendance at all meetings of the society to members in good standing, invited guests and registered exhibitors.

Recommending an amendment enlarging the duties of the secretary, placing all business affairs in his hands under the Board's supervision, and the office to be known as that of Executive Secretary.

Instructing the president to appoint an "advisory dental education committee" to establish closer relationship between the profession at large, the colleges and the State Examining Board.

Authorizing a drawing account up to $500 for use of education, industrial and oral hygiene committees; making a donation of $25 to the Eastman Memorial Fund.

Officers for the ensuing year were elected as follows: President, Z. N. Wright, Dayton; president elect, W. H. Hayden, Youngstown; first vice-president, Chas. W. Mills, Chillicothe; second vice-president, H. M. Semans, Columbus; secretary, F. R. Chapman, Columbus; treasurer, A. O. Ross, Columbus. Delegates to the N. D. A. for two years: F. M. Casto, C. W. Mills, W. A. Price, T. I. Way; alternates, J. K. Douglas, J. J. Welker, F. M. Pursell, C. H. Schott. Member of Board of Directors for three years: H. C. Brown. Ad Interim Committee: the president, president elect, secretary, treasurer, L. L. Barber, H. C. Brown and W. S. Locke.

The next meeting will be held in Columbus, December 3, 4, 5, 1918. The proceedings of the recent meeting will appear in future issues of THE SUMMARY.

> THEY THAT HAVE BEEN BEFORE US HAVE DONE MUCH, BUT THEY HAVE NOT FINISHED ANYTHING
>
> —SENECA

War Savings Certificates are exempt, both as to principal and interest, from all taxation imposed either by the United States or any political unit thereof.

A very great deal of good is sure to come to all of us here in America as a result of the war. Among other things, we are going to learn the strength, the beauty and the effectiveness of disciplined lives, as compared with the helter-skelter, hobblehehoy sort of existence that most of us have been living. Why, there are among us women who would be offended mortally if told that they were not ladies, who stamp across the floor, bang doors, yell over the telephone, say "Yeh" when they mean "Yes," shout at their children; and there are men who do all of those things and a great many more besides, who still consider themselves "just as good as anybody, b'gad," men who hardly are to be tolerated among civilized beings. All of these things are doomed to sudden extinction, once the discipline that alone means the salvation of our liberties has come to be understood for what it is, the greatest civilizing influence in the world.

Several times during the past year I have asked for criticisms of THE DENTAL SUMMARY—and I have meant just what I said. If there is any way in which THE SUMMARY can be improved I want to know it. The only reply thus far received was one complaining that the type used was too small for comfortable reading by men who had reached or passed middle life. To show my cordial reception of such suggestions, I wish to refer all readers to the new dress in which THE SUMMARY appears with this, the initial number for 1918. While the body of the type now used is of the same size as the old dress, the faces are considerably larger, very much clearer and more easily read, particularly that in which the discussions and the matter in this section are set. It is true that not quite so much matter can be included in each number, but the difference in quantity will not be noticeable, while the quality will be so much superior to any period in the past. Just take the trouble to compare THE SUMMARY with any other dental journal on your table; we are quite willing to abide the result. Then tell your neighbor that THE DENTAL SUMMARY is the *one* dental journal that *no* dentist can afford to be without.

Will you help me just a little? I am doing all I can to help you and the entire profession in every way that seems open to me—by thinking, writing, speaking, supplying lectures and slides for oral hygiene propaganda, etc. All I ask in return—just now, that is—is that you see to it that every other dentist in your locality is a subscriber. If you do that little thing for me you will help me to double our subscription list during the present year, and that means increased quality without too great cost over income.

Of course, you and every other thinking man who reads THE SUMMARY knows that it is published at a loss to its publishers every year. There is hardly a chance that it ever should be otherwise; because I always have spent and

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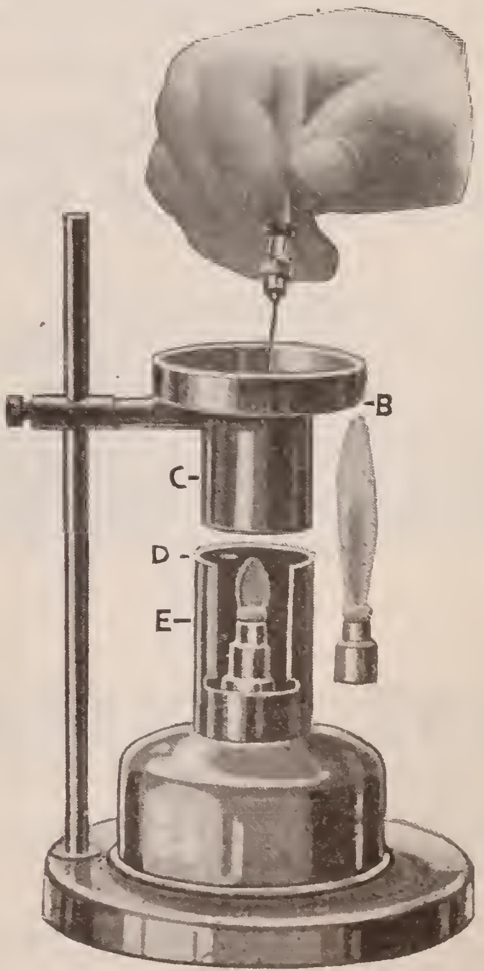


PATENTED
INVENTION OF DR J P FLAHERTY

expect always to spend more money on improvements than the increased income. Did you ever stop to think that every year's subscription costs us more than ninety cents? It is true. If it were not for the income from advertising, this magazine, and every other dental magazine if not every magazine of any class, would be forced to suspend publication. Yet, every now and then some Wise Old Owl breaks out in a fresh spot with condemnation of the "commercialized" dental magazine, claiming spotless purity for himself, of course. Do you know, those things always give me That Tired Feeling? But they do more than that: they expose in the spotlight the Smallness, with a Big Ess, the Ignorance, with a Big Eye, and the Conceit of the fellow who writes the stuff. Every fellow who so indulges his childishness has a string to his bait, usually—"And now, Beloved Brethren, you must know by this time that the 'Ambitious Dentist,' not in any manner connected with any of those Robbers, the Supply Houses, spotless in its purity of purpose being, as it is, entirely divorced from commercialism, is the only one for you to take and read—*and now is the time to subscribe!* Advertising rates made known on request." Selah!

Now, turn back to the December number and read the short prospectus for 1918. Notice what Dr. Bethel promises in his department. Then be very sure to read every one of the articles in this number: The first installment of a series to run through the year, by Dr. Chalmers J. Lyons, D.D.Sc., on "Fractures and Dislocations of the Jaws." And other noteworthy articles, "Indications and Technic for Root Resection," by Carl D. Lucas, of the faculty of Indiana Dental College; "Root-Canal Problems and Modern Methods of Treatment," by I. Lester Furnas; "Selective Anesthesia for Hazardous Risks," by Dr. Thomas G. Aller; "Apiectomy," by Earl Brooks, D.D.S. All these, in addition to the regular departments, conducted by the most able men in the profession.

If you will do this—read these articles—we know that you will recognize each number of THE DENTAL SUMMARY as being worth much more to you than the cost for twelve numbers, an entire year.

We are trying, Dr. Bethel and I, to make THE SUMMARY the ONE magazine that no dentist can afford to be without.

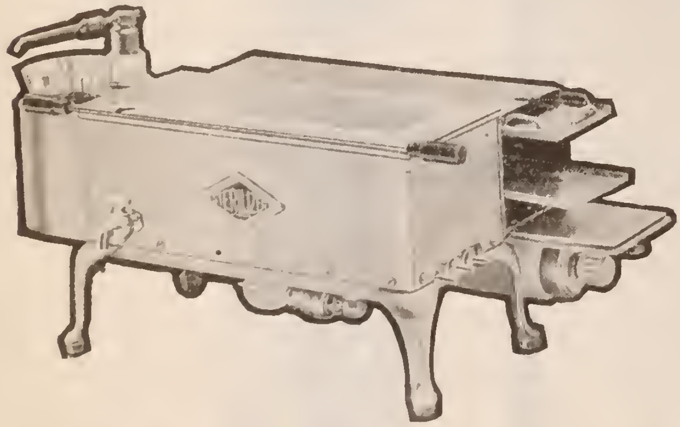
If you have not renewed your subscription for 1918, do so at once, before we shall have been obliged to increase the price.

Condescension

Modesty is an engaging quality in a young man, and the War Office is said to have appreciated the letter of a youth with no military experience whatever who, in applying for a commission, stated that he would be quite willing to start as a lieutenant.—*Punch.*

If you still are harboring the idea that because you happen to have the money you have the right to buy and consume anything that

—here's the Greatest Sterilizer ever offered you——



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you may casually fancy, jerk it up by the roots and throw it over the fence. The fact that you have money is simply evidence of the fact that you have earned the right to as much of the products of the world as you *need*. That's all. The man who buys and consumes more than he needs is violating one of the fundamental laws of the universe—a thing that no animal will do because he cannot.

For that baby—buy Thrift Stamps. They will furnish the nucleus of a nest egg to be used for his education.

HELP TO WIN THE WAR

Every Dentist Can Render Efficient Aid by Reducing the Cost of Doing Business

No matter what your particular line of activity may be, no matter how you are earning your living, you can aid very materially in Winning our War for Humanity by sincere cooperation toward the reduction of the cost of doing business.

If every reader once can bring himself to a full and complete realization of the fact that this Nation of ours has resolved itself into one gigantic corporation, and that the one single "business" of that corporation is Winning the War, and that every loyal citizen of the United States is a member of that corporation, it will not be necessary for any one of them to ask anybody what he can do to help. The work of each is precisely that which he can do best.

Then we must bring ourselves to consider that every dollar in the United States is a part of the capital of that organization, and belongs not to that particular individual who happens to be using it, but to the Gigantic Corporation of which he is a part.

As in the case of private concerns where economy long has been known to be the first and most important requisite to success, any member of this National Corporation who wastes anything is not doing his full duty; and the man who causes others to waste is just as guilty.

In this blessed U. S. A., full to overflowing with abundance of everything, we have become careless; we seem not to have taken home to our consciousness the fixed and immovable fact that Waste Anywhere makes Want Somewhere; and have not looked upon it as any concern of our own how much it has cost others to do business.

Now, however, a change is necessary. Now we know that the one aim and purpose of all business, all work, all endeavor, is the grim business of Winning the War; and that every penny of unnecessary expense anywhere means just that much of our common capital and income that is impaired to just the amount of the unnecessary expense.

This applies with particular force to the expense of doing business—that is, of carrying on any of the subsidiary industries in which the various partners are engaged, every one of which should and must contribute its share to the common fund if we are to hope to Win this War.

Every dollar unnecessarily added to the cost of doing business is a dollar wasted. If conserved and properly applied, that dollar will feed one of our soldiers over in France for four days. If wasted, everyone of us must dig down into his pocket and hand over another dollar to take its place, each his share.

Waste anywhere is Want somewhere. Waste is money spent needlessly; it is two spoonfuls of sugar in your coffee when one is enough; it is covering your section of apple pie with sugar when it already is sweet enough; it is ordering a spool of thread, or a hank of yarn, or a yard of muslin, or a pound of meat, or a package of coffee, or anything else that you can carry just as well as not, delivered by the tradesman from whom it is purchased; it means ordering a single tooth, or an ounce of alloy, or a dozen burs, or anything of that sort, delivered by messenger when you might just as well bunch your orders and have them all delivered on a single trip, or wait until you are down town and then buy your stuff and carry it yourself.

Many of our largest and most progressive merchandise concerns have posted "Cash-and-Carry" notices, meaning that deliveries have been discontinued and that no purchases are to be charged.

All such economies should be voluntary; the government expects them to be voluntary; but unless there is a very general response to the appeal of necessity, it may become necessary for all of us to see that some of us learn how to behave ourselves under these stressful conditions.

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Defense Society Calls *for* Local Vigilance Corps

Immediate Action Necessary Says Their Appeal

Recent events in this country make it plain that the German method of propaganda which has been so effective in Russia and Italy is now being attempted in this country with an alarming degree of success, according to the appeal to Americans now being issued by the American Defense Society. German propaganda has long been supplied to our troops in the national encampments. The ship-building program is being interfered with by German-inspired strikes. Germans are directing the hoarding of food supplies to an extent that panics have already been prevalent in the leading cities. Newspapers are giving daily reports of fires in ammunition plants and grain depots and the country is now on the verge of an even greater calamity in the shape of a railroad strike of unprecedented extent which threatens to cripple our national industry.

The far-reaching need of the local Vigilance Corps can readily be seen when it is known that in this country alone there are today several million alien enemies representing Germany, Austria, Bulgaria, Turkey and other countries sympathetic or allied with the Prussian autocracy. Almost without exception these enemies are free to go about as they see fit, and while the government has done much toward tightening the censorship of mails and cables, nevertheless there are numberless channels by which these enemies are in touch with the directing genius of German propaganda in Berlin.

If Americans mean to stand by the men at the front, whose lives are already being sacrificed, and to stand by their government, the opportunity is offered in the additional service they can give to this work of the American Defense Society.

The plan of organization undertaken by the society and recommended to loyal Americans provides for the enrollment of a small American Vigilance Corps in every city and town which shall classify all residents under the following terms:

1. Loyal.
2. Disloyal.
3. Doubtful.
4. Unknown.

Following the general classification of citizens the committee is urged to make further designation of the following list:

1. Alien enemy.
2. Pro-German.
3. Anti-government.

In the letter of instructions to branch organizations the Executive Committee of the American Defense Society gives the following directions:

"At the earliest possible moment, when you have made your classification of alien enemies, pro-Germans, and those opposed to the government in this war, send this list to the police department, the local representative of the Department of Justice and to whatever representatives of the army or navy intelligence bureaus there are in your community. Do not let this matter rest, however, with this first classification of the enemies. Too much stress cannot be put on the importance of having your own vigilance corps take steps to watch alien enemies, pro-Germans and those opposed to the government. Only by such co-operation will you be able to give effective aid to the government. Take every means you can to let the people of your city know the names of our enemies."

Unofficial announcement has already been made at Washington that the government is about to register the alien enemies in America. Your committee already having acted along such lines, will naturally be in a position greatly to aid the government census when such a census is taken. No doubt many attempts will be made to evade the official government census and information on the enemies in your community will therefore be of greatest value.

"You are enjoined to watch the speech, associations and activities of every man whom you may suspect of disloyalty and to send in the immediate report. For further information and instructions regarding the work of the Vigilance Corps of the American Defense Society, address National Headquarters, 44 East 23rd street, New York City."

From the President's Message

"Let there be no misunderstanding. Our present and immediate task is to win the war, and nothing shall turn us aside from it until it is accomplished. Every power and resource we possess, whether of men, of money or of material, is being devoted and will continue to be devoted to that purpose until it is achieved.

* * *

"We shall regard the war as won only when the German people say to us, through properly accredited representatives, that they are ready

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XXXVIII February, 1918 No. 2

We Publish the Proceedings of the Following Societies:

The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
Iowa State Dental Society
Texas State Dental Society
Tennessee State Dental Society
Section on Stomatology—American Medical Association
Interstate Association of Anesthetists
and Several Local Dental Societies

Editorial Office: 195 16th Avenue, Columbus, Ohio
L. P. Bethel, M.D., D.D.S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

FRACTURES AND DISLOCATIONS OF THE JAWS*

BY CHALMERS J. LYONS, D.D.SC., ANN ARBOR, MICH.
PROFESSOR OF DENTAL SURGERY, UNIVERSITY OF MICHIGAN

DEFINITIONS OF FRACTURE

The word *fracture* (fractura, from frangere, to break), or in other words, breaking, conveys to the mind so clear an idea that a definition perhaps might tend to obscure it. However, many definitions have been given.

Grove defines fracture as a division of the bony fibers occasioned by external violence or muscular contraction.

Richard Wiseman, in the seventeenth century, defined fracture as "a solution of continuity in bone suddenly made either by contusion or flexure." This definition so completely expresses the conditions of fracture that the author finds it difficult to improve upon it.

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*All Rights Reserved. (Continued from January SUMMARY, page 19.)

"The liability to fracture of the different bones of the body varies greatly in consequence of their difference in size, shape and degree of exposure to external violence or extreme muscular action."—*Stimson.*

Consequently, on account of the more exposed position, shape and lack of support, the mandible is more susceptible to fracture than that of the maxillæ. In a classification of 2,358 fractures of the different bones of the body, 27 fractures of the mandible were observed and only three of the maxillæ, making the ratio of nine to one. The author's own records coincide with this ratio.

In order to omit none of the questions involved in fractures of the jaws, the discussion of the subject will be arranged under eight heads, viz.: (1) the etiology; (2) the varieties; (3) the signs and symptoms; (4) the diagnosis; (5) the process of repair; (6) the complications; (7) the prognosis, and lastly (8) the treatment.

ETIOLOGY

We shall study under this head the predisposing and the exciting causes of fracture of the jaws.

The predisposing causes may for convenience and clearness be divided into two parts: First, certain general predispositions unconnected with any morbid state; second, the effects of certain diseases in facilitating the occurrence of fracture.

The general predisposing causes of fracture of the jaws are connected with the influence of age, sex and occupation. Seasons could be added to the general predisposing causes in the discussion of fractures in general, but can scarcely be said to have any influence on the occurrence of fractures of the jaws.

Influence of Age—The bones of the jaw are more flexible in early life and more brittle in old age. Consequently an accident which might produce a fracture in old age might not yield the same result early in life on account of the difference in the degree of fragility of the bones.

Fractures of the jaws have been observed at all times of life from early childhood to extreme old age, but by no means with the same degree of frequency.

Guret, in 1862, tabulated 1383 cases (hospital and dispensary) of fractures in general, with reference to the ages of the patients, and found in the first decade 265; in the second, 193; in the third, 274; in the fourth, 224; in the fifth, 154; in the sixth, 155; in the seventh, 72; in the eighth, 38, and in the ninth, 8.

Combining them with statistics showing the relative number of people living at the different ages, he found the highest relative proportion of fractures in the period above the age of sixty years.

Malgaigne, in 1847, tabulated 2377 fractures in all parts of the body, classed according to age, and he found that fractures occur most frequently in subjects of from 25 to 60 years, becoming more rare above and below these ages as we depart from them respectively; so that as regards the rarity of fractures the extremes of life approach one another.

The writer knows of no authentic statistics that have been compiled relating to fractures of the jaws according to age. These accidents result largely in the pursuit of certain occupations making easy the occurrence of fractures, and in certain environment which makes it favorable for fractures of this kind to occur.

As these occupations are followed during the so-called earning period of a man's life, it follows, then, that the highest relative proportion of fractures of the jaws occurs between the ages of 21 and 50 years. Our statistics at the University Hospital, Ann Arbor, Michigan, bear us out in this statement.

Fractures of the jaws in early childhood are rare; so are they above the age of 60 years. In the early years children are not exposed to those conditions or environments which are so favorable for accidents of this kind; neither are those at the other extreme of life likely to be so subjected.

Influence of Sex—Fractures of the jaws are more numerous in men than in women because of the greater exposure of men to accidents which cause them. In the early years the difference is slight. In middle life the fractures of the jaws are many, many times greater in men than in women. Then, again, above 50 years the difference is slight.

Influence of Occupation and Environment—Occupation and environment are the greatest factors in the predisposing causes of fractures of the jaws. The rapidity of twentieth-century travel not only by train but automobile is responsible for many of these accidents. The building of sky-scrapers and other buildings in the cities is adding greatly to the increasing number of jaw fractures. Then the large manufacturing establishments with powerful machinery (some of it unprotected), with its beltings and cables, coupled with a tendency to carelessness on the part of the employes, take their toll, also, in accidents of this description.

AFFECTIONS PREDISPOSING TO FRACTURE OF THE JAWS

Fractures of this kind are known as spontaneous or pathological fractures. These affections may behave in two ways: First, they may render the osseous tissue more fragile; and second, they may increase inordinately the power of the muscles acting on the bones, the latter being brought about by an inflammatory process going on in the osseous tissues which stimulates muscular activity.

Rachitis—Inability due to rachitis is found only in children. This disease is one which involves the bone only during the period of growth, and its strength and firmness is diminished. This disease affects only the long bones; consequently as the mandible is developed similar to long bones, this would be weakened by this disease and spontaneous fracture would be encouraged. This condition, however, is rare.

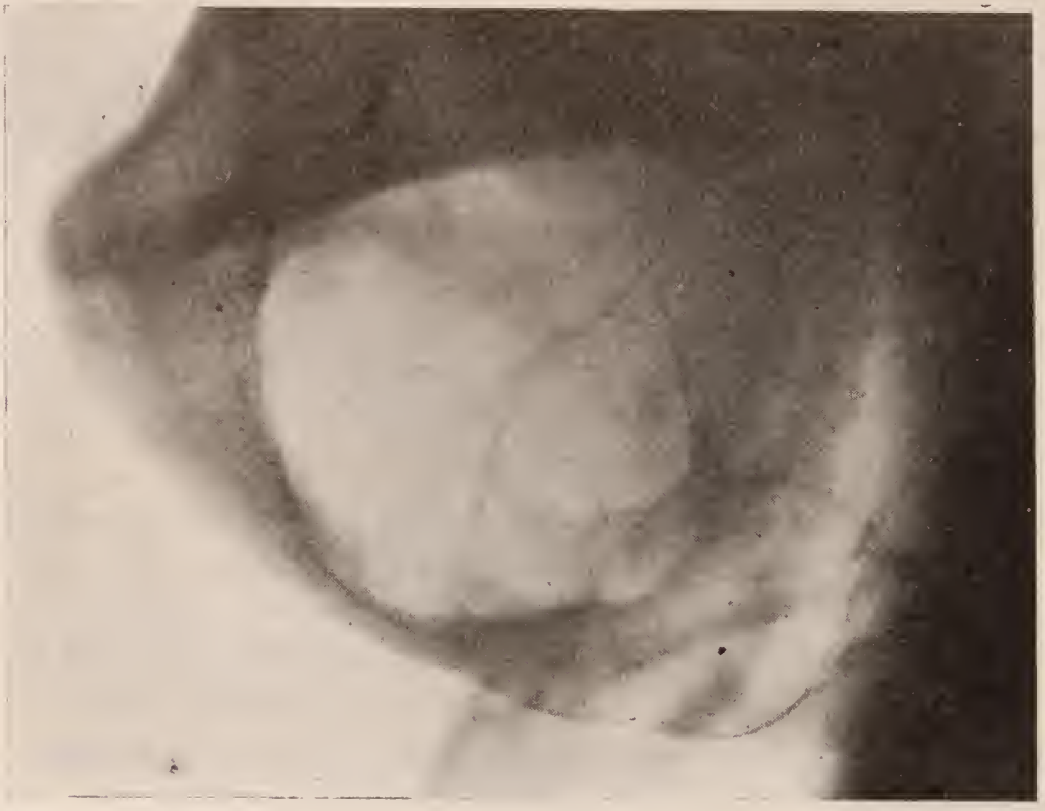

Fig. 4—Sarcoma of the jaw.

Carcinoma and Sarcoma of the Jaws—A malignant tumor may lead to fracture of the lower jaw by the tumor occupying the bone itself primarily or secondarily, and destroying it to such an extent that the slightest muscular force will be sufficient to fracture it. (*Fig. 4.*)

Dentigerous Cysts—These cysts may remain and develop in the jaw until a very large portion of the osseous structure is destroyed. Here too the slightest muscular contraction may be sufficient to cause a fracture. A case recently came under the author's attention (*Fig. 5*), of a young man 17 years of age, where the cyst had been developing for a period of less than six months. The cyst involved all of the coronoid process and a large area in the posterior region of the horizontal portion of the mandible. Just distal to the first molar tooth less than two millimeters of the bone substance was intact. Fortunately this case was operated on before spontaneous fracture occurred.

These cysts produce cystic degeneration of the cancellated bone and cause direct absorption by pressure of the tumor on the cortical layer, and their action is purely local in character.

Osteomyelitis—Acute osteomyelitis of the mandible occurs most frequently in children between the ages of five and sixteen.

Infection of the cancellous portion of the bone may occur from the extraction of an abscessed deciduous tooth and involve a varying portion of the bone. This may continue until the entire mandible is involved and a spontaneous fracture may result as a consequence of muscular contractions. A case of this kind has come under the writer's attention. The patient, a little girl of six years, had a deciduous molar tooth extracted, followed by a deep infection which finally involved all of

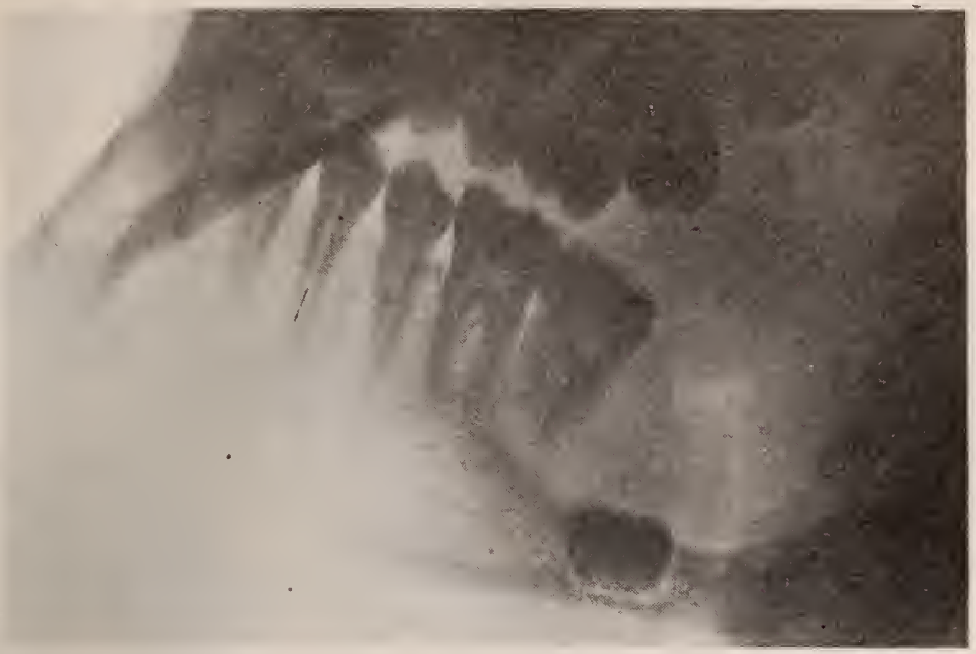

Fig. 5

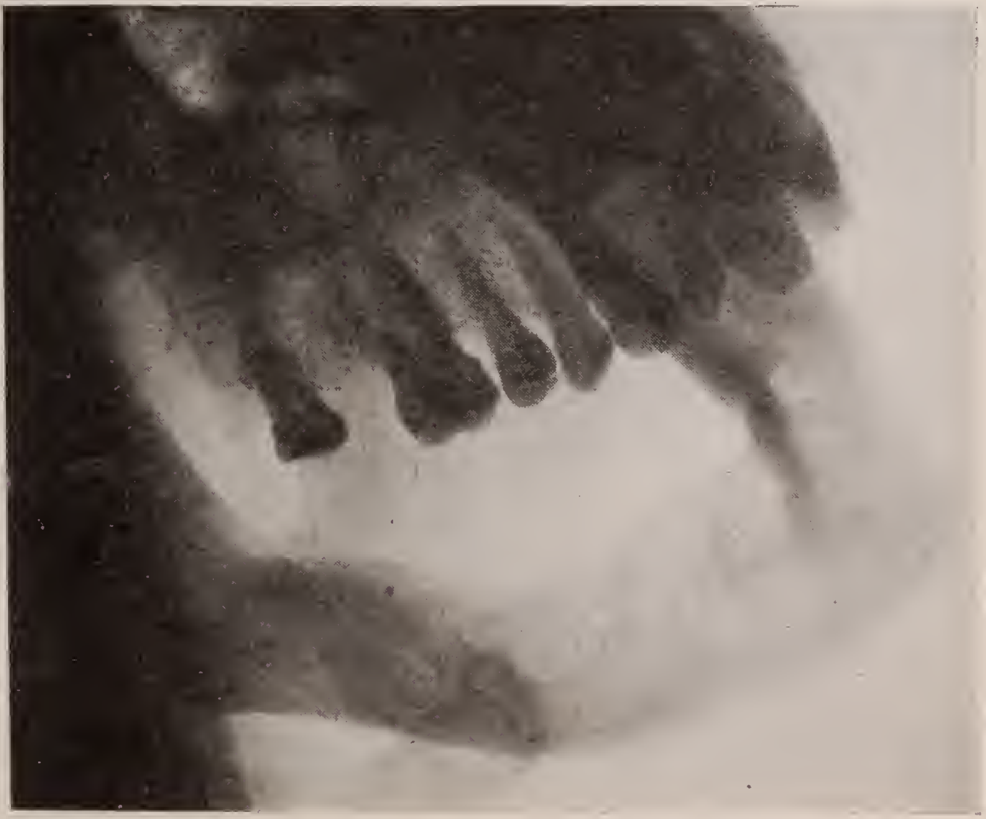

Fig. 6—Spontaneous fracture of the mandible in a man age 35, due to osteomyelitis.

one side of the mandible. A fracture ensued and later the entire ramus was removed before the infection was brought under control.

THE DETERMINING OR EXCITING CAUSE OF FRACTURE

The exciting causes of fracture of the jaws are classified under two heads, viz., Direct and Indirect. When the bone yields at the point where the force is applied we say that the fracture is direct, or by direct violence; when it occurs at a point at some distance from the point where the force is applied it is then known as fracture by indirect violence. In case of fracture by direct violence the soft tissues are

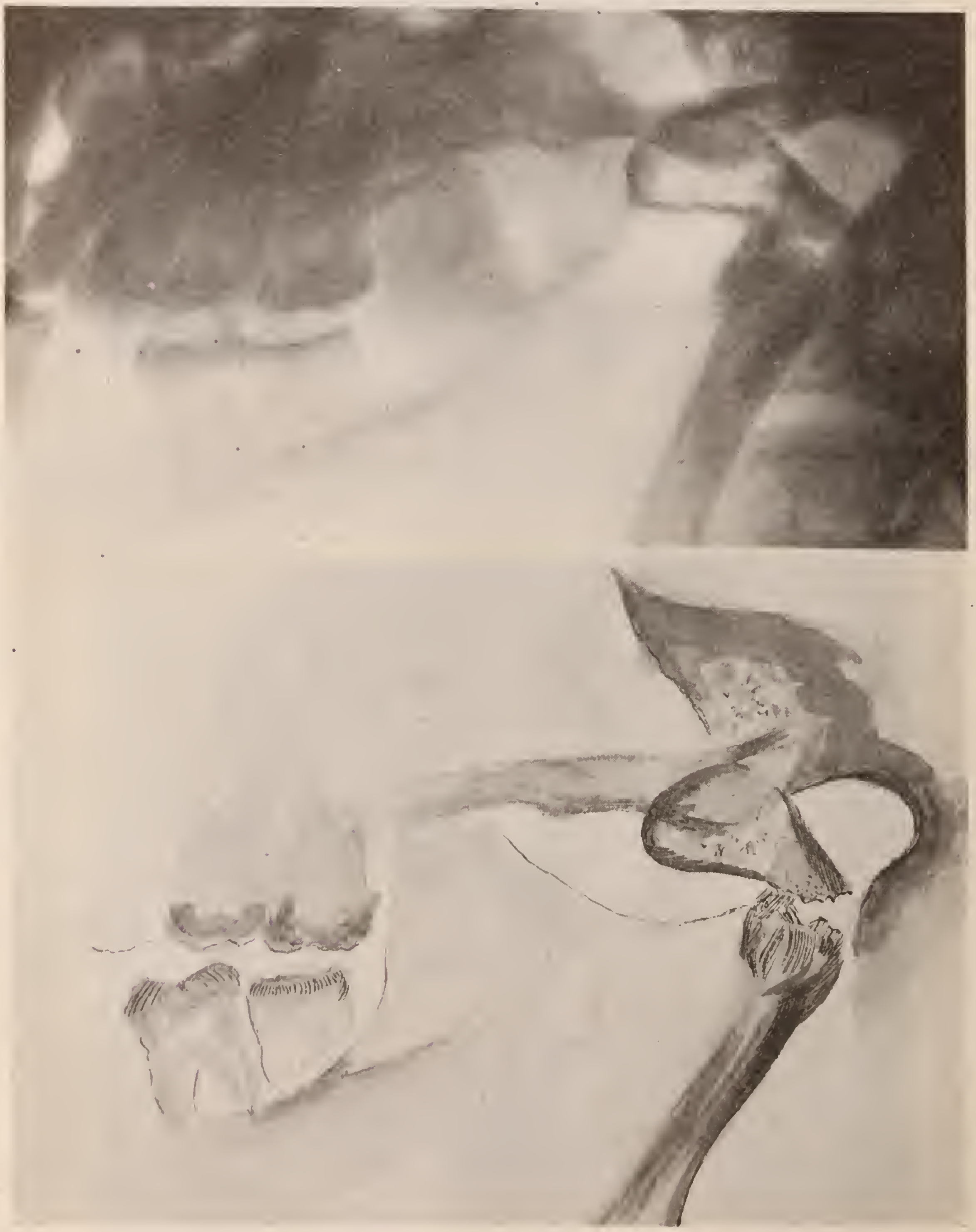

Fig. 7

usually simultaneously injured. These may be simply contused or they may be badly lacerated, or they may be badly torn and missing (such as in gun-shot wound), and the bone protruding. There are exceptions, however, to these conditions of the soft tissues, and occasionally it may be difficult to ascertain whether the fracture is caused by the so-called direct or indirect violence.

Fracture by indirect violence is due to the overbending of the bone or by force being exerted through the bone that over-exerts the normal elasticity of the bone. In the jaws, fracture by indirect violence usually is observed in the mandible and rarely in the superior maxilla. *Fig. 7*, fracture of the condyloid process, is an illustration of this kind. The point of violence was the chin resulting from an automobile accident. The seat of fracture was at the neck of the condyle.

The bones involved in fractures by indirect violence may be torn, twisted or pulled apart. In the case illustrated by *Fig. 7* the head of the condyle was torn from its articulation and dislocated in front of the eminentia articularis.

Falls and Blows—Probably two of the greatest factors in the determining and exciting causes of fractures of the jaws are falls and blows. Falls may occur from various heights, upon a surface hard or

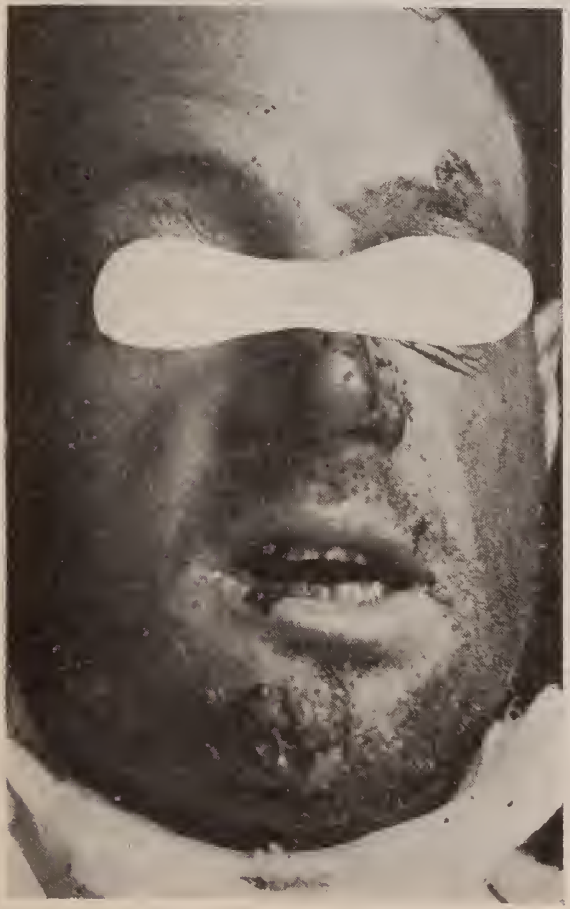

Fig. 8

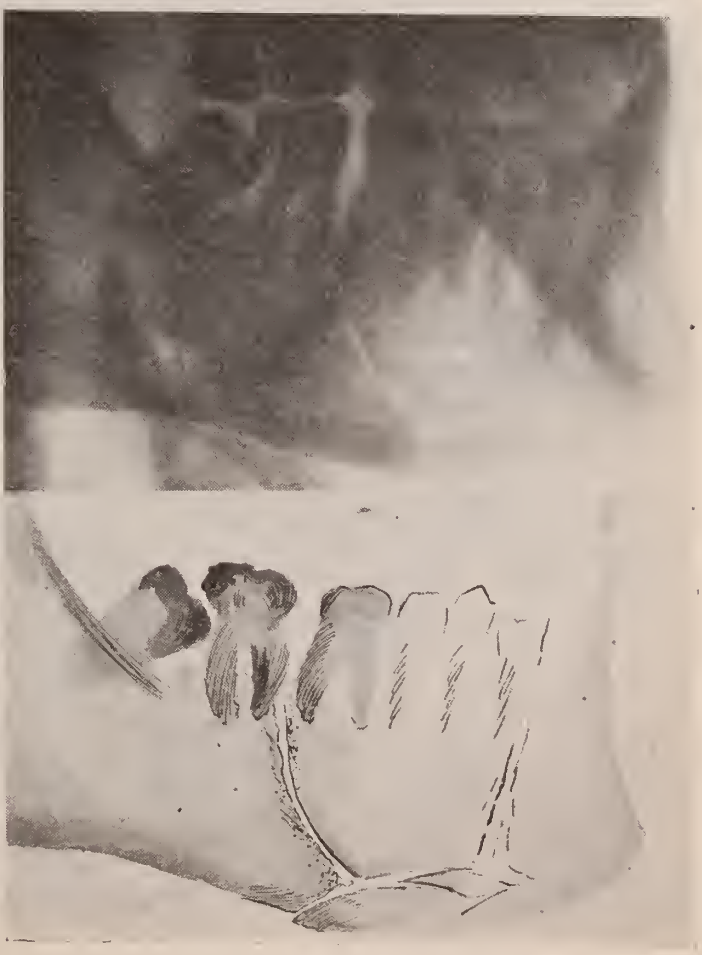

Fig. 9

Fig. 8—Result of fall from scaffolding.
Fig. 9—Shows multiple fracture of jaws in same patient.

soft, smooth or rugged, or there may be something like a succession of falls, as for example, a workman falling from a building, striking a beam or scaffolding, breaking the fall, then later tumbling to the ground. Nothing is more variable in the results of fracture of the jaws than a fall. A fall of a few feet sometimes will result in a more serious fracture than a fall from much greater heights.

Blows on the face, such as the kick of a horse, blows from the fist, striking the jaw with a baseball, stone or club or a blow on the jaw from a piece of machinery are all responsible for many of the fractures of the jaws. These usually are fractures by direct violence but occasionally the fracture occurs at a point distant from the site of the injury, and fracture by indirect violence results.

Pressure or Crushing Force—Hamilton reports two cases of fracture where the etiological factor was pressure or crushing force.

The first was a fracture of the mandible in front of the right cuspid tooth in a lad 8 years old, produced by being pressed between two wagons, the pressure being made upon the two angles of the jaw. The second, a case in which a double fracture was produced in a young

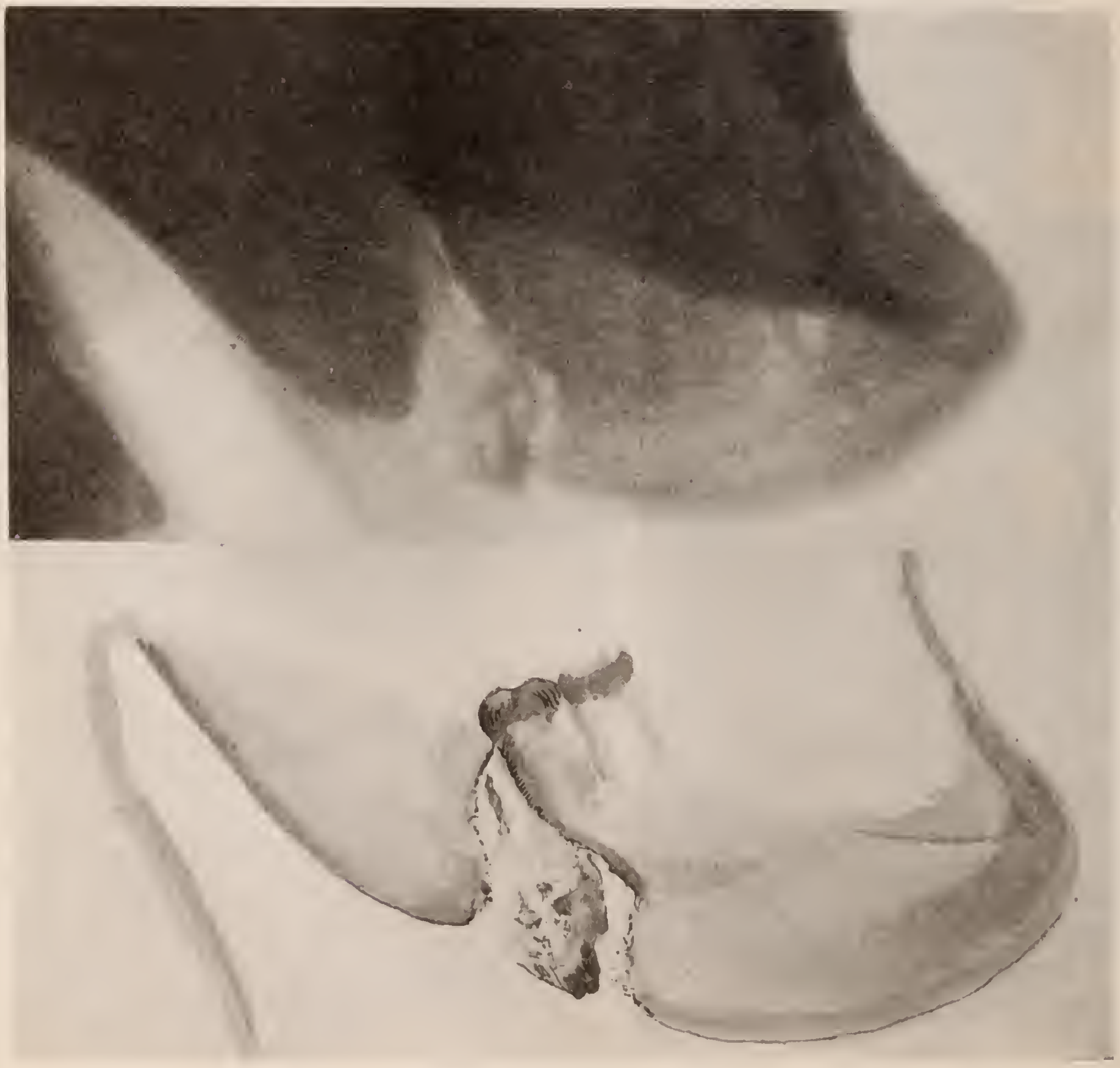

Fig. 10

woman by the grasp of her husband's hand. Both of these fractures were those produced by indirect violence.

Fracture of the Mandible as a Result of the Extraction of Third Molar Teeth—Fractures of this kind are not numerous, yet they cannot be considered rare. This is brought about by too much stress being exerted upon the jaws in the attempt to remove the tooth, or by the cutting away of the osseous tissue to such an extent that the mandible becomes unduly weakened at this point and a slight stress in the attempt to remove the tooth will result in fracture. *Fig. 10* is a case of this kind; *Fig. 11*, result of sequestra in same case.

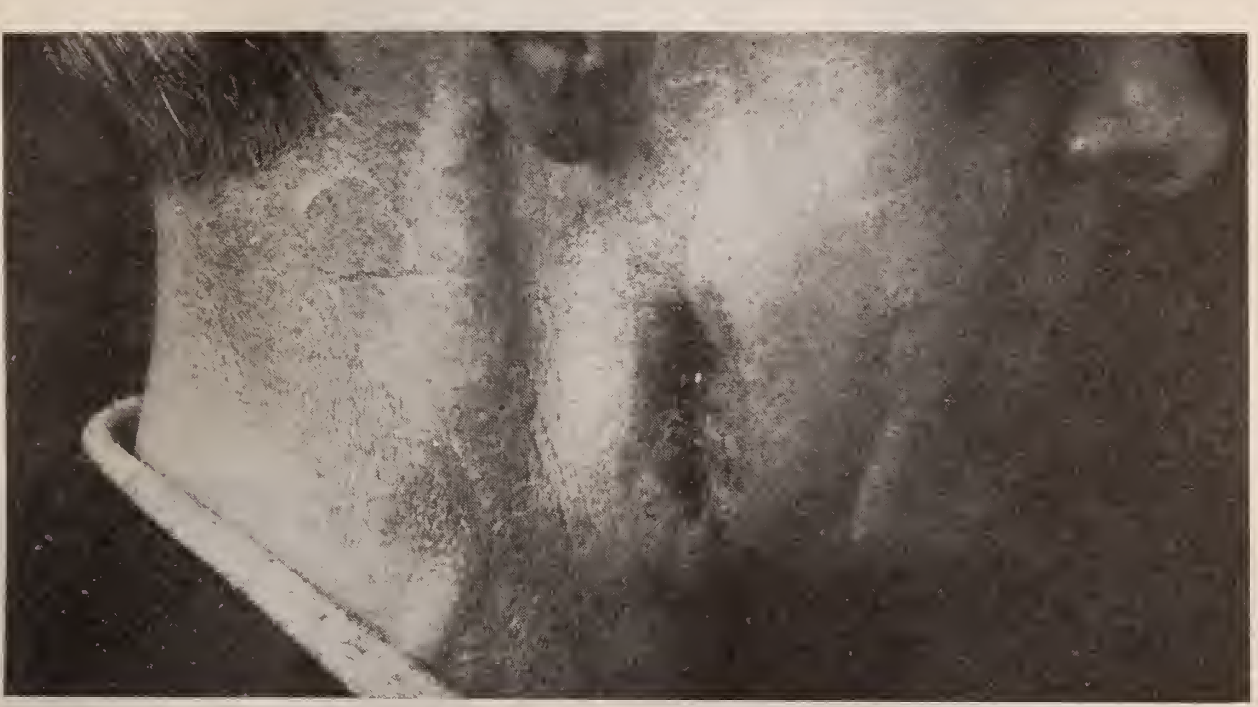

Fig. 11

Piperno classifies the etiology of fractures of the maxillæ as follows:

1. A Direct Blow:
    - (*a*) At the level of the upper lip.
    - (*b*) On the lower part of the bone.
    - (*c*) On the superior alveolar border from below upward.
    - (*d*) On the median part of the face from before backward.
    - (*e*) On the base of the nose from above downward.
    - (*f*) On the mandible from below upward.
    - (*g*) On the malar bone.
        - (*1*) A lateral blow when the head is relaxed.
        - (*2*) A central blow when the head is moving toward a central body.
        - (*3*) An anterior blow when the head is resting on the occiput.
        - (*4*) Any external blow when the head is resting on the opposite malar bone.

- (*h*) Simultaneously on the face and cranium.
- (*i*) Direct blows on the various portions of the face and in different directions.

2. Gunshot injuries.
3. Crushing injuries, from car wheels, etc.

This classification of the etiology of fractures of the maxillæ is complete and practically covers all of the possibilities in accidents of this kind.

A similar arrangement can be made of the fractures of the lower jaw, as follows:

1. A Direct Blow:
    - (*a*) At line of lower lip from above downward.
    - (*b*) On the lower border of the mandible either in front or on either side.
    - (*c*) At the angle of the jaw from the side.
    - (*d*) At the angle of the jaw from behind forward.
    - (*e*) On the inferior alveolar border from above downward.
2. Gunshot wounds.
3. Crushing injuries around the jaws from any violent accident.

Gunshot wounds—special features:

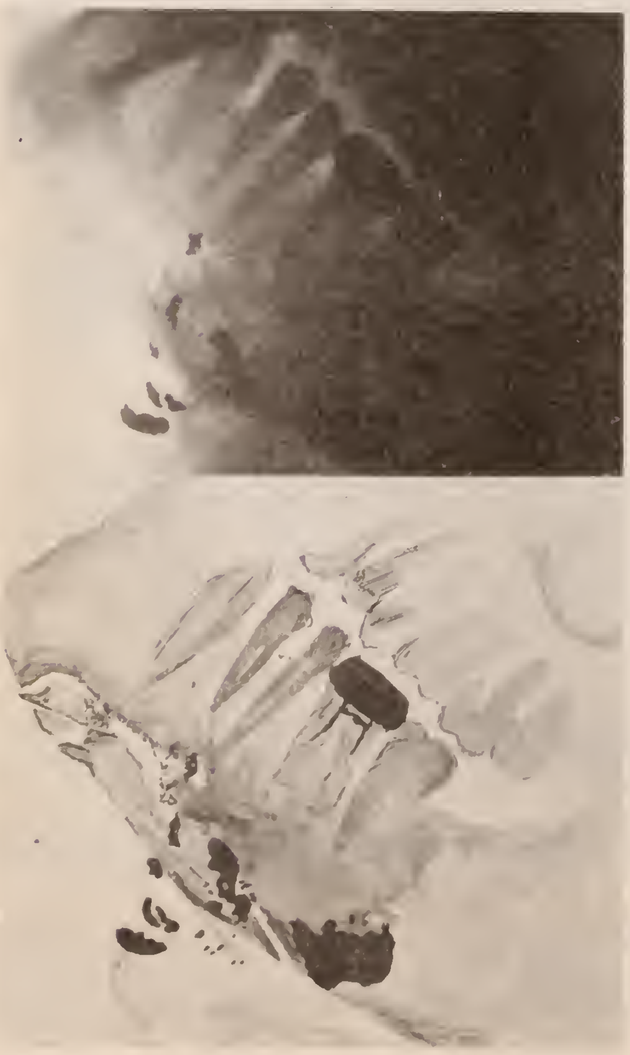

Fig. 12

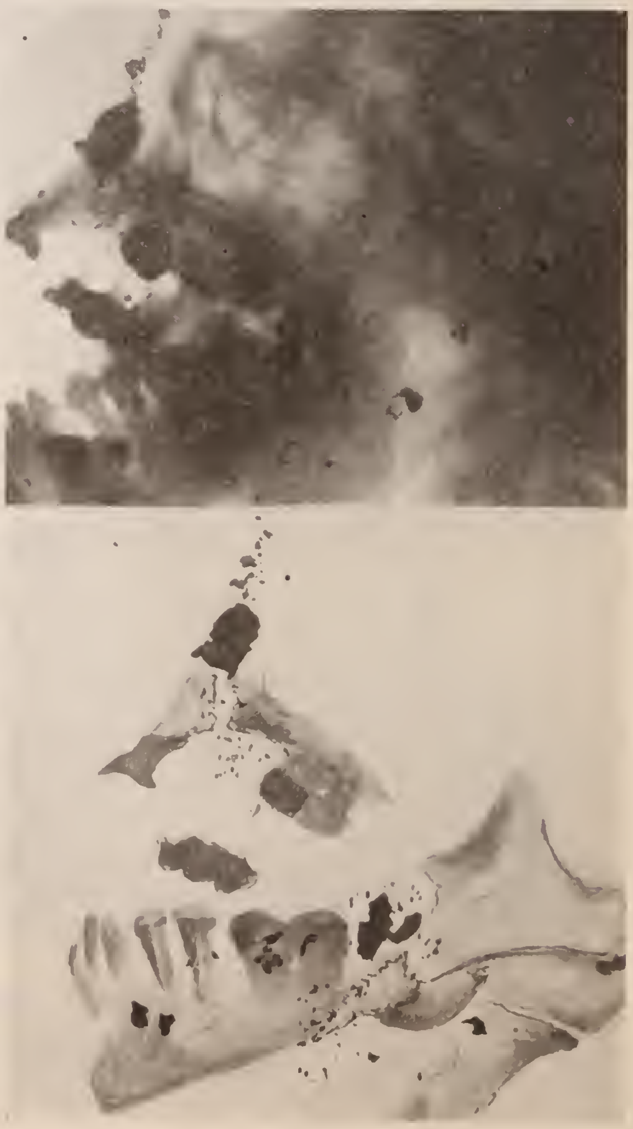

Fig. 13

1. Extensive laceration of the soft part.

2. Extensive splintering and fissuring of the bone and the bruising of the tissues along the track of the bullet which usually prevents prompt repair of the wound. (*Figs. 12 and 13.*)

3. Infection of the wound, in practically every case on account of infected material being carried into the wound with the bullet.

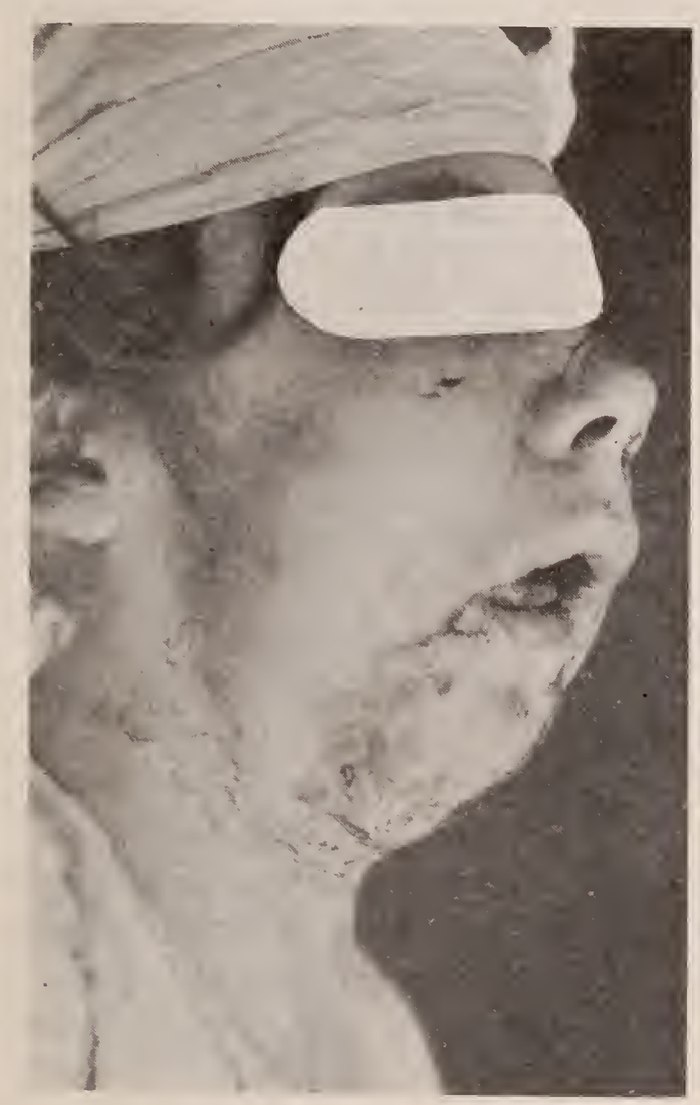

Fig. 14—Same patient as Fig. 13

CLASSIFICATION—VARIETIES OF FRACTURES

In a general sense fractures may be divided into two great classes of simple and compound. Sometimes these are spoken of as closed and open.

A simple or closed fracture is one in which there is no communication between the air and the bone—in other words, the tissue between the bone and the air is intact, the bone only being involved.

A compound or open fracture is one in which there is an external wound leading to the break in the bone, or where the intervening tissue is involved as well as the bone—in other words, two or more different tissues are involved in the fracture.

All fractures come under one of these two heads.

These types of fractures may be sub-divided into several varieties according to the character and direction of the fracture, under two main heads, viz., Incomplete and Complete, according to Brophy.

Under Incomplete we find three types: (*a*) Greenstick, (*b*) Fissured, (*c*) Depression.

Under Complete, eight types may be found: (*a*) Transverse, (*b*) Oblique, (*c*) Spiral, (*d*) Longitudinal (*e*) Comminuted, (*f*) Impacted, (*g*) Complicated.

Definitions: *Incomplete Fracture* is a fracture in which the bone is not completely separated.

Greenstick Fracture is one in which the bone is bent and the fracture takes place on the convex side of the bend. This type of fracture only occurs in very young people when the lime salts are not completely deposited. This type of fracture of the jaws is very rare. Seen chiefly in fracture of the long bones in early childhood.

Fissured Fracture is one in which there is a crack or fissure in the bone, occasionally found in bones forming the vault of the skull, and is difficult to diagnose. The normal sutures of the bones of the skull may be mistaken for fissured fractures and vice versa in cases of fractured bones of the head. This type of fracture is usually the result of indirect violence or when the fracture occurs at some distance from the point of violence.

Depression Fracture is one in which a fragment is depressed below the surface; seen in fracture of the skull, as result of contusion.

Under the incomplete fractures we may find a fracture commonly known as splintered fracture when a small portion of the bone is splintered off with sharp fragments, the fragments being attached to the bone. This is seen in fracture of the lower jaw where there is a multiple fracture or where the jaw is fractured in several places. (*Figs. 9 and 12.*)

Under the classification of complete fractures (*a*), (*b*), (*c*), (*d*), viz., transverse, oblique, spiral and longitudinal, are so named from the relative direction of the fracture, and so the direction of the fracture implies its kind.

Comminuted Fracture is one in which the bone is crushed and a splintering of a portion of the bone into small fragments. This is frequently seen in gun-shot wounds and in crushing injuries around the jaws from a violent accident. (*Figs. 12 and 13.*)

In the mandible the cancellated portion usually is flattened or crushed and the cortical portion splintered.

Impacted Fracture is one where one fragment is driven firmly into the other; seen in complete fracture of the superior maxillæ when the bones are driven back in towards the base of the cranium.

Complicated Fracture is one in which in addition to the bones involved, some important structure such as nerve, vessel or joint is injured, as in *Fig. 7*.

SIGNS AND SYMPTOMS OF FRACTURE

The signs and symptoms of fracture can be divided into two groups:

First: Objective signs, or those which can be observed directly by the surgeon. They are deformity, abnormal mobility, malocclusion of the teeth, crepitus and swelling.

Second: Subjective symptoms, or those symptoms for his knowledge of which the operator has to depend upon statements from the patient. They are pain, tenderness, loss of function and history of the patient.

OBJECTIVE SIGNS

Deformity: The deformity which may be present will vary in extent. It will depend upon the force and direction of violence, the changes produced in the relation of the fragments to each other, the extravasation of blood into the wounded tissues and the inflammatory processes which have taken place.

The changes produced in the relation of the fragments to each other usually are recognized by observing the occlusion of the teeth. However, this is not so simple in some cases when the natural occlusion of the teeth of the particular individual is abnormal. Neither is it a simple problem to recognize in an edentulous jaw. In fracture of the arms or legs the relation of one fragment to the other can be ascertained sometimes by mensuration, but in the jaws this method is not practicable on account of the normal asymmetry, the difference not being due to traumatism. In these cases the surgeon must depend largely upon palpation in ascertaining the amount of displacement. Difficulties and uncertainties will exist in palpating on account of swelling and blebs.

Ecchymosis or extravasation of blood into the tissues is rarely absent in the deformity which is produced. The appearance of ecchymosis may be delayed, however, for several days. It is more marked and more extensive in older patients. The blood which escapes from the fractured parts makes its way along the muscular tissues and first may make its appearance at some distance from the fracture. Its appearance is an objective sign of fracture.

Abnormal Mobility: Mobility appearing in a bone where it did not previously exist, or permitting a portion of it to move while the remainder remains at rest, is pathognomonic of fracture. This condition usually is present in fracture of the horizontal portion of the mandible. In attempting to elicit this sign of fracture the parts of the jaw at some distance from the supposed seat of fracture should be grasped between the thumb and fingers of each hand and gently manipulated. The manipulation should be deliberate and gentle and conducted in such a manner as to cause little or no damage to the wound.

In many cases it will not be necessary to look for this sign, for the displacement of the fragments and malocclusion of the teeth will be sufficient evidence of fracture.

Malocclusion of the Teeth: This is a symptom that may or may not be present in fracture of the jaws. The presence of malocclusion of the teeth will depend upon the extent and locality of the fracture and largely upon muscular tension upon the fragments. A single fracture posterior to the last molar teeth rarely will cause displacement of the anterior fragment and in such cases the teeth usually are in natural occlusion. The natural occlusion of the patient may not be normal occlusion and the surgeon may be deluded in the abnormal appearance; so this is a sign that also has its uncertainties and sometimes may be misleading.

Crepitus: This is always a positive sign of fracture. Crepitus is a sensation communicated through the hands of the operator by one fragment of bone grating upon the other. It sometimes is audible. Crepitus may be demonstrated by the operator grasping one fragment with one hand and gently manipulating the other fragment with the other hand in the endeavor to rasp one fragment against the other. Crepitus cannot always be obtained in fracture and only can be brought out in complete fracture. It is not present in greenstick, fissured or depression fractures; neither can it be elicited in impacted fractures. It is more commonly present in fractures of the mandible. On account of a possible injury to nerves and vessels in the endeavor to obtain crepitus, only very gentle manipulation should be permissible. The fragments may be splintered and in violent rasping of one fragment against the other, the splinters may cut or pierce the soft tissues connected with the fracture.

Oedema: This is a condition that nearly always is present in fracture of the jaws. The character and extent of the swelling will vary with the location of the point of violence, the amount of traumatism and the quality of the tissues involved. (*Fig. 15.*) [1]The irritation produced by the violence may produce changes in the vaso motor nerves such as paralysis, which also may lead to an increase of the vascular secretion. It is not definitely known just what changes the vessels suffer under these conditions but it is thought that some changes in the endothelial cells and cement substances of the vascular walls take place, rendering them more permeable. As a consequence of the increase of vascular secretion into the tissue spaces, the lymph flow is unable to carry it off as rapidly as it accumulates and œdema results.

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[1] Zieglar.

It may be due to arterial congestion in the periosteum or muscular tissues as the result of the trauma, or it may be due to stagnation of the blood when, through trauma, there is a marked hindrance to the outflow of blood from the capillaries, the pressure in the capillaries rises and the fluid portion of the blood seeks a lateral outlet so that an increased amount of fluid escapes from the vessels. The amount of escaped fluid is the larger the greater the degree of discrepancy between the inflow and outflow; it is therefore increased through a coincident increase of the blood inflow.

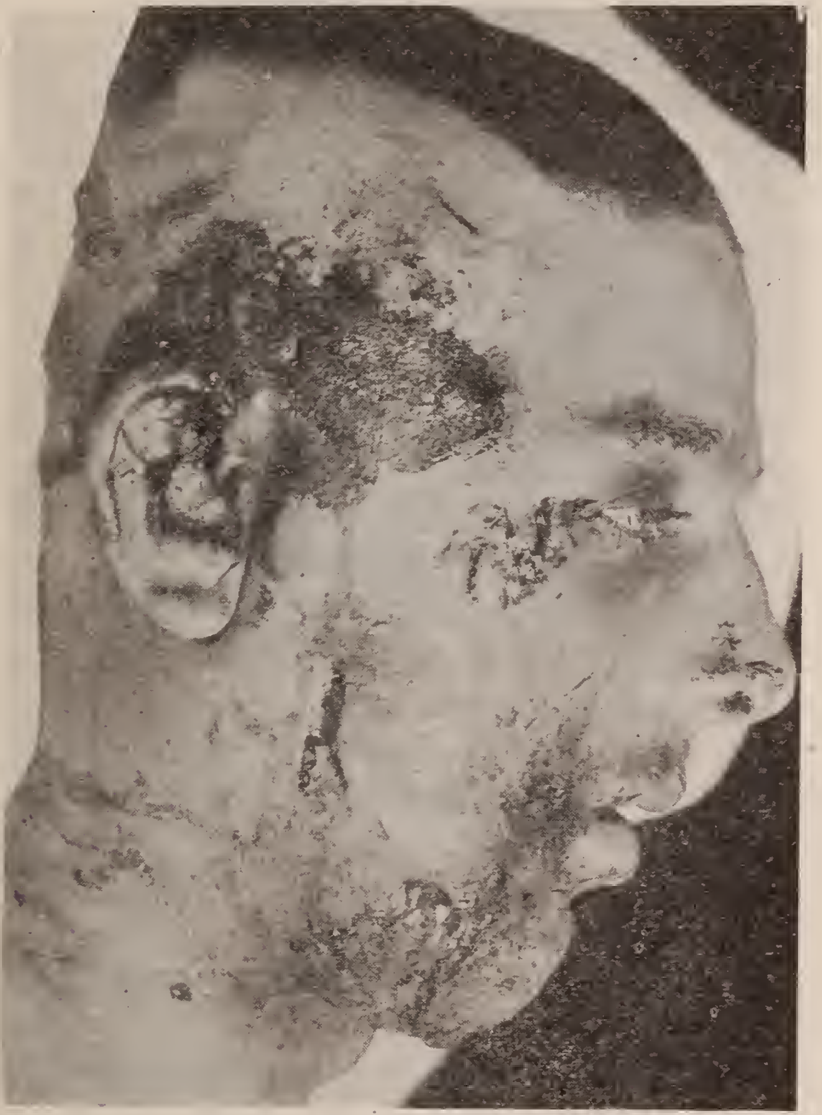

Fig. 15—Shows fracture

The immediate results of an increased transudation from the blood vessels is an increase in the lymph flow and this may be sufficient to carry off all the fluid. If it does not so suffice the fluid collects in the tissue spaces and then results the condition of œdema.

(*To be continued.*)

SOME MUCOUS MEMBRANE AFFECTIONS OF THE MOUTH*

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STRANGE AS IT MAY APPEAR at first thought, dentistry and dermatology are closely allied specialties. This is particularly true if dentistry is made to embrace, as it properly should, the study and care of the mucous membrane of the mouth, namely, stomatology. Dermatology, which properly entails the study and care of the skin in health and disease, is inextricably engrossed in the study and care of the dermatologic membrane and covering of the body, when it transgresses over and passes into a cavity such as the mouth; and many dermatologic affections which begin on the surface of the body, pass directly into the oral mucous cavity, or often begin in the latter orifice and either directly or indirectly secondarily affect the skin. Therefore, it is quite apparent that dermatology and dentistry bear a somewhat close, intimate relationship to each other, without interposed barriers, and with every prospect of the two specialties being drawn closer and closer together, in accordance with our increasing fund of knowledge in the two subjects and their respective scope of activity. When we consider, moreover, that the teeth are mere appendages of the mucous membrane, analogous to the appendages of the skin, namely, the hair and nails, whose study and care are strictly in the province of dermatology, it is readily apparent that the two specialties permit the narrowest degree of actual separation and the closest degree of analogy and reciprocal study.

Having thus established friendly, intimate and fraternal relations for our respective specialties, permit me to present for your kind consideration the salient, clinical features of some of the more commonplace mucous membrane affections which often are observed first but seldom properly recognized by the dentist, and which usually receive their first intelligent care and attention at the hands of the dermatologist. It has come to the writer's notice often that patients suffering from oral mucous membrane affections have sought first-hand attention from dentists and were astounded at their lack of professional skill and knowledge in that direction. Furthermore, dentists often are nonplussed by their personal limitations to the extent that they do not know whether or not they have an infectious or non-infectious condition to deal with and whether or not they are justified, from their own, the patient's or their clientele's standpoint, in giving or denying their professional skill. It is these observations in particular that have prompted me to present this practical lantern demonstration to you this evening, in order that you may be able to acquaint yourselves with some of the more commonplace mucous membrane affections, and guide yourselves accordingly.

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*An illustrated address before the Cincinnati Dental Society, 1917.

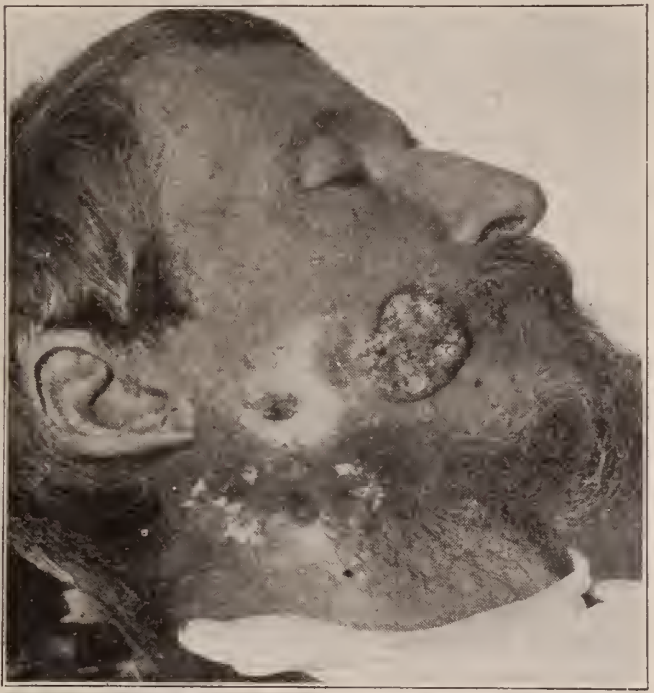

Fig. 1—Actinomycosis or "lumpy jaw," an infection almost invariably acquired from contact with cattle affected with lumpy jaw; primarily involving the jaw and simulating sarcoma or cancer. Secondarily involving the skin with the formation of numerous sinuses which discharge a thick serous fluid containing characteristic silver-yellow plaques.

ACTINOMYCOSIS

The first mucous membrane affection which I wish to present for your consideration is actinomycosis, or lumpy-jaw. This illustration (*Fig. 1*) was taken from one of my earliest patients, Mr. J. H., at., 53 years, who presented himself October 14th, 1902, with the following history: In January, 1902, patient began to complain of a neuralgic pain in the jaw which simulated the proverbial toothache so closely that the patient was obliged to call the services of a dentist to his relief. The dentist was unable to discover any disturbance on the part of the teeth commensurate with the degree of local pain and distress, and advised the patient to seek the services of his family physician. When the anodynes and local applications of the latter failed of their purpose, the patient was referred back to the dentist with instructions to have a certain molar removed regardless of its soundness. The pain persisted with increasing intensity and was soon accompanied with a swelling and induration of the right half of the lower jaw, diffused, doughy, almost board-like in character and gradually involving the overlying skin and intervening soft tissues. The unfortunate patient, within an interval of several months, was referred from dentist to physician for neuralgia, and from physician to dentist for the extraction of molars and offending bicuspids, until nearly all the teeth on the affected side of the face were withdrawn. In the meantime the pain and swelling increased until the skin over the lower jaw became the site of a half-dozen sinuses which discharged an abundance of sero-sanguinolent pus. At this stage expert surgical consultation resulted in a diagnosis of sarcoma of the jaw, and a recommendation of its surgical removal, to which the patient would not give his consent because of the precarious and disfiguring nature of such an operation and because a favorable result would not be vouchsafed. The clinical picture at that time must have been typical and characteristic. The diffused brownish-red, doughy, almost board-like infiltration of the overlying skin, studded with sinuses which were discharging thin, watery pus, which contained the characteristic grayish-yellow flakes, and which, under the microscope, readily would reveal the presence of the characteristic ray fungus, should have proven to be highly suggestive, if not actually unmistakable. If any further data was lacking, the mere fact that the man was a dairyman, the owner of sixty-three head of cows, one of which had developed lumpy-jaw in the fall of 1901, would have been all-sufficient in nature. The patient withdrew from physician, dentist and surgeon, and placed himself under the care of an X-ray quack who gave him some twenty or thirty X-ray exposures with the result that the actinomycosis was not benefited and an X-ray epithelioma was induced.

On October 14th, 1902, on the date of the patient's first visit to the writer, the clinical recognition of actinomycosis was an easy matter, and was readily confirmed by a microscopic examination. The internal administration of potassium iodid, from October 14th, 1902, to February 7th, 1903, effected a complete and permanent cure of the actinomycosis.

SIMPLE ABSCESS, ERRONEOUSLY DIAGNOSED ACTINOMYCOSIS

At this point I wish to cite another case which came to my personal attention at almost the same time, early in the course of my professional career. On November 10th, 1902, Mr. T. E., one of Cincinnati's most opulent and respected middle-aged citizens, was referred to the writer for X-ray and Finsen-light treatment, with a diagnosis of actinomycosis, established and confirmed by six or more reputable physicians and surgeons. Laboratory evidence also was not lacking. T. E. was a capitalist and a history of exposure to lumpy-jaw infection was not forthcoming. The patient presented himself to the writer merely for treatment because he was the sole possessor in Cincinnati at that time of both Finsen and X-ray apparatus. He refused the privilege of a personal examination and even discouraged cursory inspection. When the writer refused attention without the privilege of some form of examination; he yielded reluctantly to a very superficial examination. There was no diffused board-like induration, no dark reddish-brown discoloration; swelling and inflammation seemed to be well centered at one point at the middle third of the lower jaw on the left side; one particular molar over the site of greatest swelling was exceedingly sensitive to percussion. A single fistulous tract, underneath the jaw, freely discharged thick, creamy pus, which saturated the beard and soiled the collar and shirt bosom. Characteristic macroscopic yellowish flakes were not in evidence in the secretion, and the microscopic-ray fungi were not in evidence. A diagnosis of central necrosis was made, a confirmatory skiagraphic examination at the hands of Dr. Custer, of Dayton, Ohio, a pioneer at the time in that field of endeavor, was urged, and further therapeutic attention was refused. The writer's suggestions merely merited the patient's displeasure, but he was gratified to learn that surgical intervention about one year later eventually confirmed his tentative clinical diagnosis.

SYPHILIS OF THE ORAL MUCOSA

Of the many affections which involve both the skin and mucous membranes, the most frequently encountered is syphilis. Its presence upon the oral mucosa always is a matter of significant interest and importance to the dental profession, and its prompt and unmistakable recognition in its infectious form is of inestimable value, not only because a patient may be apprised of the danger of an ignored or neglected grave infection, but inasmuch as such knowledge usually safeguards the dentist and his clientele against accidental infection. Many syphilologists estimate fifteen to twenty per cent. of the urban population of the country to be syphilized. Such an estimation seems very conservative to the writer for those who lead a more or less immoral life. He also is strongly inclined to believe that syphilis in the larger cities and smaller communities is rapidly increasing in amount and that the rural districts are not spared the general permeation. Immorality naturally is the chief source of the infection, and some of the current causes for its more wide-spread character are the high cost of living and the resulting longer and longer-deferred marriage age; the ever-increasing love of luxury, finery, pleasure and indolence; and last, but not least, the modern automobile, which has created a heretofore unheard of and unexpected opportunity for immorality and which probably is the most potent of all factors in the consummation of improper sexual lust. When syphilis becomes prevalent in a community, extra-genital or accidental infection becomes more frequent, and dentists, physicians and nurses form a very large contingent of those who accidentally are infected in the pursuit of their vocation. The vast majority of infections occur among those who were unaware and failed to recognize that they had an infectious patient to deal with; and worse than all, it occasionally comes to the syphilologist's notice that dentists at times have infected through personal ignorance or carelessness, their own patients. When syphilis becomes pandemic, as in certain areas of Asia Minor, for example, accidental or extra-genital infection is the rule and venereal infection is the exception. Under these circumstances it is a matter of greatest importance and gravest concern that dentists should acquaint themselves with some of the clinical features of mouth syphilis in its active infectious form, so that they can exercise due caution and care which the exigencies of such occasions require. Inasmuch as modern treatment can change a highly nocuous and dangerous situation to a safe and innocuous one in twenty-four to forty-eight hours, the obligation becomes doubly imperative. It also is of the utmost importance not to incur the mistake and embarrassment of casting undue suspicion upon mucous membrane affections resembling syphilis which are not syphilitic.

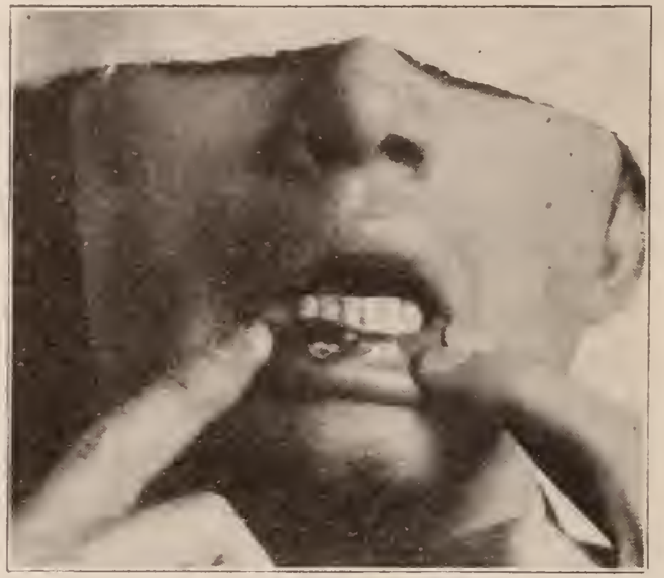

Fig. 2—Initial lesion of syphilis of the lower lip. Occupation, bank teller. Probable source, handling infected currency.

Syphilis of the mucous membranes, aside from a trite, early redness of the edge of the soft palate, begins on membrana oris mucosa, in the form of circumscribed pimples, approximately the size of a pencil point, either isolated or in groups, upon the tongue, lips, palate, buccal mucous membranes or tonsils, about three months after infection has been incurred, and a few weeks after the first eruption has faded from the surface of the body. They occur about the time when there is the first and usually only marked loss of hair resulting from the affection, on the scalp. The pimples are grayish or yellowish-red in color and some show a tendency toward central ulceration. Unlike so-called stomach sores or stomatitis apthosa, they are not particularly painful and are not surrounded with redness, inflammatory congestion. The papules of early syphilis, if unchecked by local or general treatment, show a tendency to enlarge, multiply and coalesce and thereby form large patches. They are the most infectious of all forms of syphilitic lesions, and their moist character permits the infectious germs to escape in a constant stream in a motile and active state of preservation. The sores on the surface of the body are quickly dried to harmless crusts, in which state the germs are fixed in position, unable to leave their host and quickly rendered immobile and innocuous. Therefore, a tiny sore on the mucous membrane the size of a pinhead often is a hundred fold greater menace and danger than a thousand larger sores scattered freely over the surface of the body.

It is these small, scarcely observable mucous membrane lesions that infect drinking cups, inoculate the fingers of unwary dentists and physicians and the osculating lips of lovers and kindred. Syphilis is more widely disseminated and more highly infectious in its early than later stages. These sores are more abundant and more infectious in the mouths of those infected only six months or a year than those infected a year and two years. They may recur occasionally in the uncured and untreated for many years, but usually only at long intervals and in circumscribed form. The sores of syphilis tend to become larger and larger with the advent of time, so that after five or ten years a syphilitic sore in the mouth may assume an ulceration of considerable proportions in depth and extent, a so-called gumma or tertiary lesion of syphilis. These sores, in spite of their ugly appearance and destructive nature, are less menacing and of less infectious danger than a split-pea-sized sore of early syphilis, similarly situated. Early mouth syphilis exerts its ravages essentially upon the mucous membrane covering. If it persists for any great period of time unchecked by successful treatment, the mucous membrane covering the cheeks, tongue and lips becomes studded with innumerable pits and depressions and irregular elevations, battle-scarred evidences of preceding circumscribed areas of inflammation. Such a membrane covering tongue, lip or cheek is called syphilitic leucoplakia, and though no longer infectious, it often reveals pre-existing infection and not infrequently paves the way for cancer of the mouth. It is the resulting scar and not the pre-existing syphilis that favors subsequent cancer formation. Exceptionally syphilis

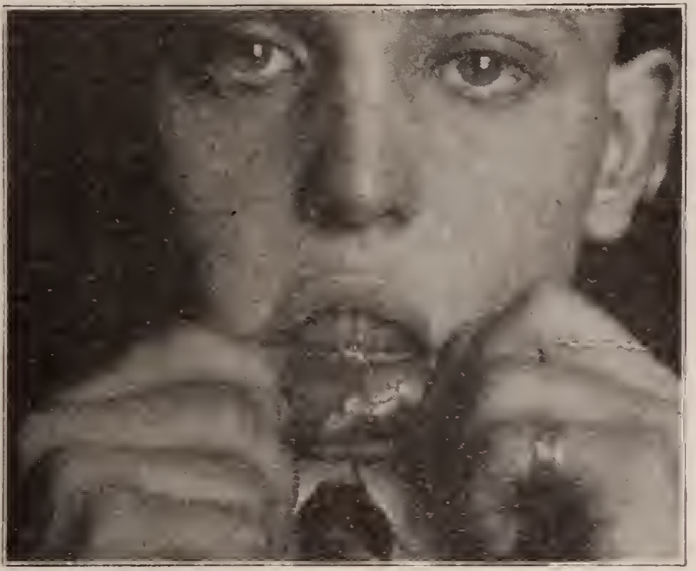

Fig. 3—Syphilitic mucous plaques. Patient is a young man who had incurred an infection of syphilis lasting for one year without knowing its true nature. These lesions are highly infectious and a menace to surroundings. Dentists and their clientele are often infected from cases of this character.

attacks the musculature or body of the tongue, what is technically called an interstitial syphilitic glossitis. (*Fig. 4.*) In that event the mucous membrane may be entirely spared and the deeper substance alone is involved, same as occasionally occurs when the disease attacks some special organ such as the liver, kidney or lung, producing what is known technically as a syphilitic hepatitis, nephritis or pneumonitis. Such a tongue is not particularly infectious. In course of time it becomes traversed by deep furrows which result from the traction exercised by the scars scattered by the disease throughout the tongue, between the bundles of muscular fibers. Such a tongue shows unmistakable evidence of an old pre-existing or existing syphilis; it is somewhat simulated by the congenital folds and furrows, occasionally observed in some people, who have what is commonly known as lingua plicata or furrowed tongue.

CANCER MUCOSA ORIS

The second most commonly encountered noteworthy affection of the mucous membrane of the mouth is doubtless cancer. This condition often is first recognizable at the hands of dentists, and proper mouth-care is not accorded if it is not promptly detected, and the patient forewarned at a time when intervention can promise possible relief. The dentist, therefore, possibly more than any other, shoulders a grave responsibility in the prompt detection of incipient mouth malignancy and should be fully qualified to recognize it in its early stages and enjoy a thorough acquaintanceship with the conditions that pave its development.

Cancer of the mouth, as well as cancer elsewhere in the body, must have its predisposing and exciting causes. It is virtually an almost undisputed fact that the cause is neither inherited nor infectious in nature. The type in the mouth is almost invariably a spinous-celled epithelioma, a very virulent form which grows rapidly, invades deeply and widely and unless treated efficiently and radically early in its incipiency, soon becomes hopelessly disseminated along distant lymph channels. (*Fig. 5.*) It is the type of skin cancer that is prone to implant itself upon an old, healed-out scar. In fact, opinion is steadily growing that cancer of the mouth is very prone to implant itself upon the old, healed-out scars which follow injury, prolonged irritation and disease, for example, syphilis or irritation and insult from a roughened pipe stem or jagged tooth. It was formerly believed that cicatrizing diseases such as syphilis, lupus, etc., were the direct causes of cancer. We now realize that these diseases are only indirect causes, and merely pre-dispose subsequent malignancy by the scars which they produce. We have learned to realize, for example, that old, healed-out scars from deep, extensive burns become malignant in due course of time. It is therefore important to jealously guard the mucous membrane of the mouth against every agency which can injure it to the slightest degree and produce cicatricial change. Oral mucous membranes, which have incurred extensive

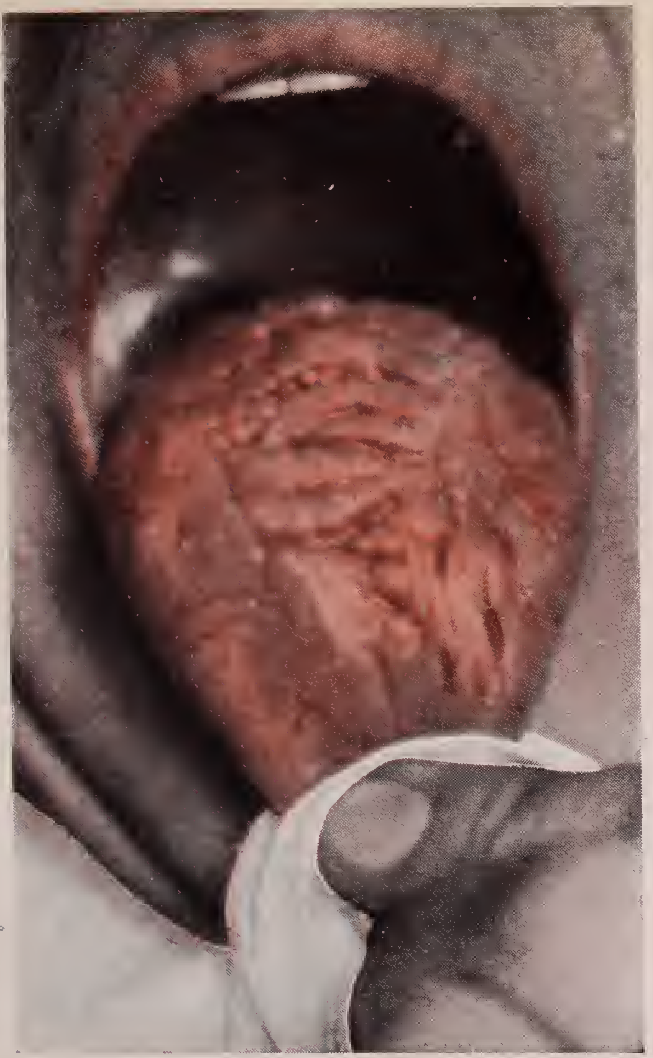

Fig. 4.—Syphilitic interstitial glossitis, a manifestation of late syphilis in which the musculature and body of the tongue chiefly are involved, cicatricial change secondarily affecting the mucous membrane.

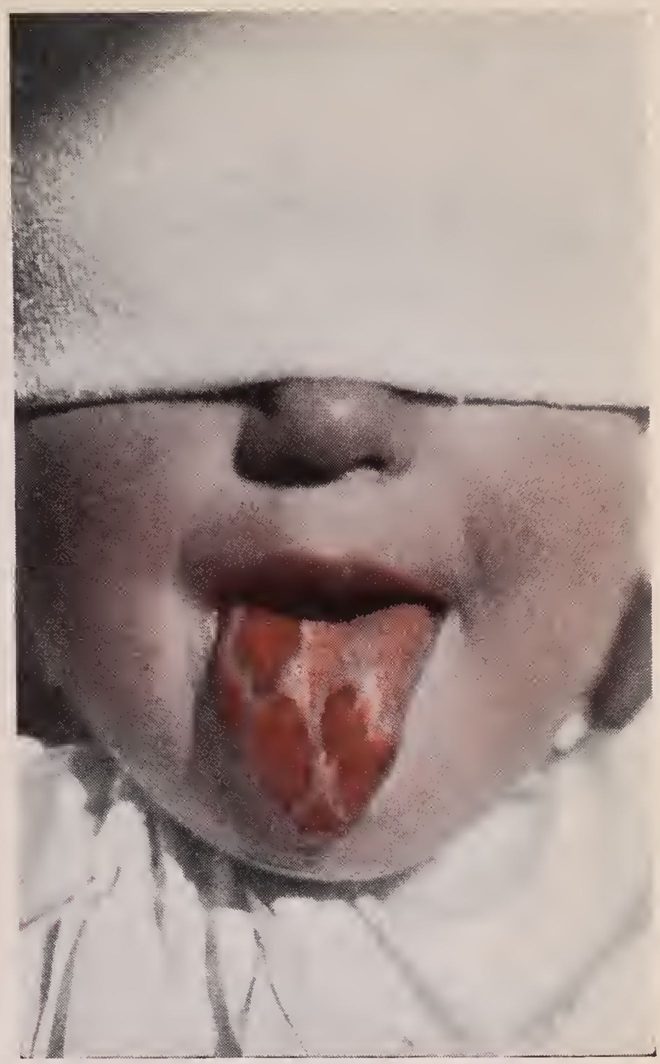

Fig. 8.—Multiple benign fugacious plaques of the tongue.

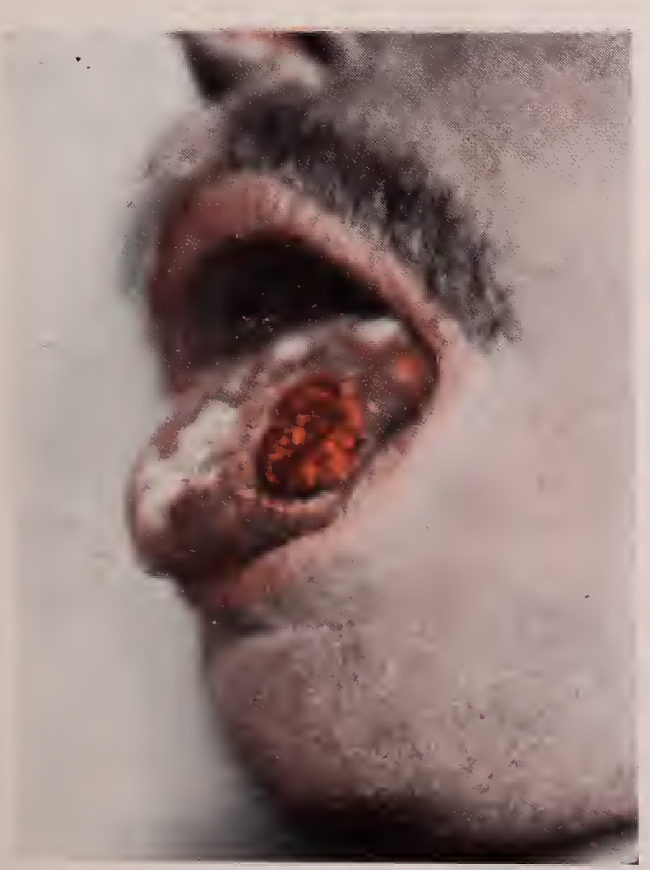

Fig. 5.—Epithelioma or cancer of the tongue implanted upon syphilitic leucoplakia.

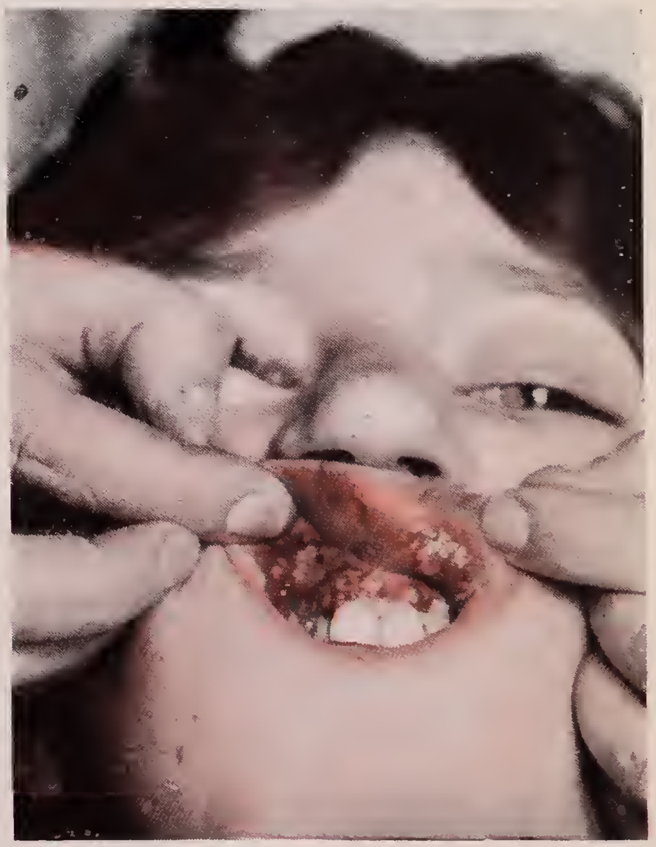

Fig. 6.—Pemphigus mucosa oris, an unusual, obstinate and refractory form of inflammation of the buccal, alveolar mucous membrane of obscure causation.

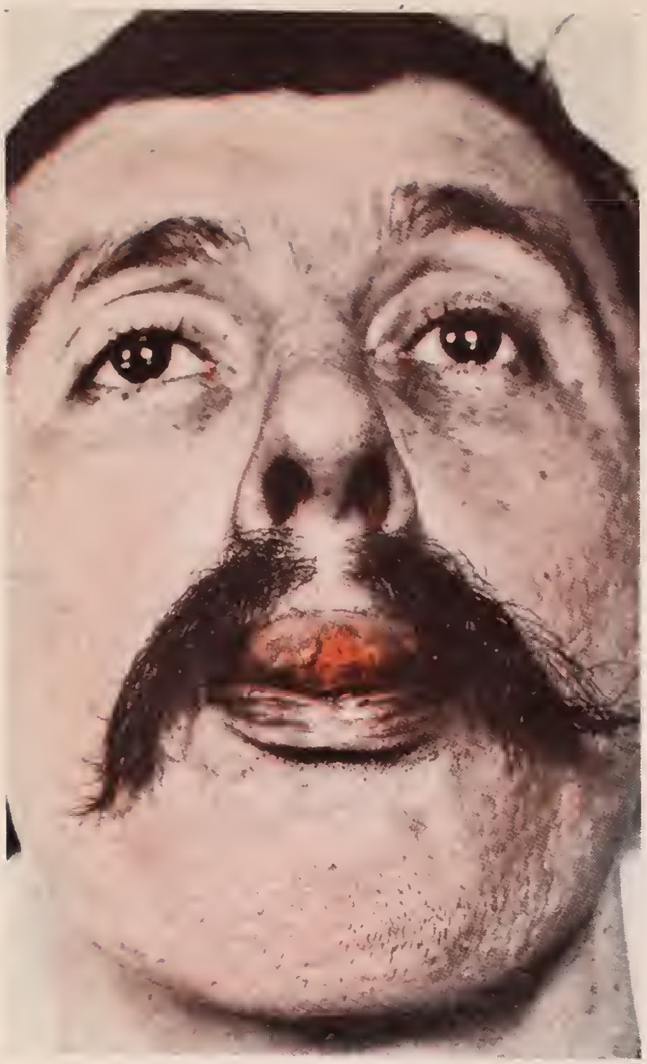

Fig. 9.—Tuberculosis orificialis. Tubercular ulcer of the tongue, the result of secondary infection from a focus further back in the respiratory process, commonly the lungs, exceptionally the larynx. This patient was in the last stages of phthisis pulmonalis and the sputum was pregnant with tubercle bacilli.

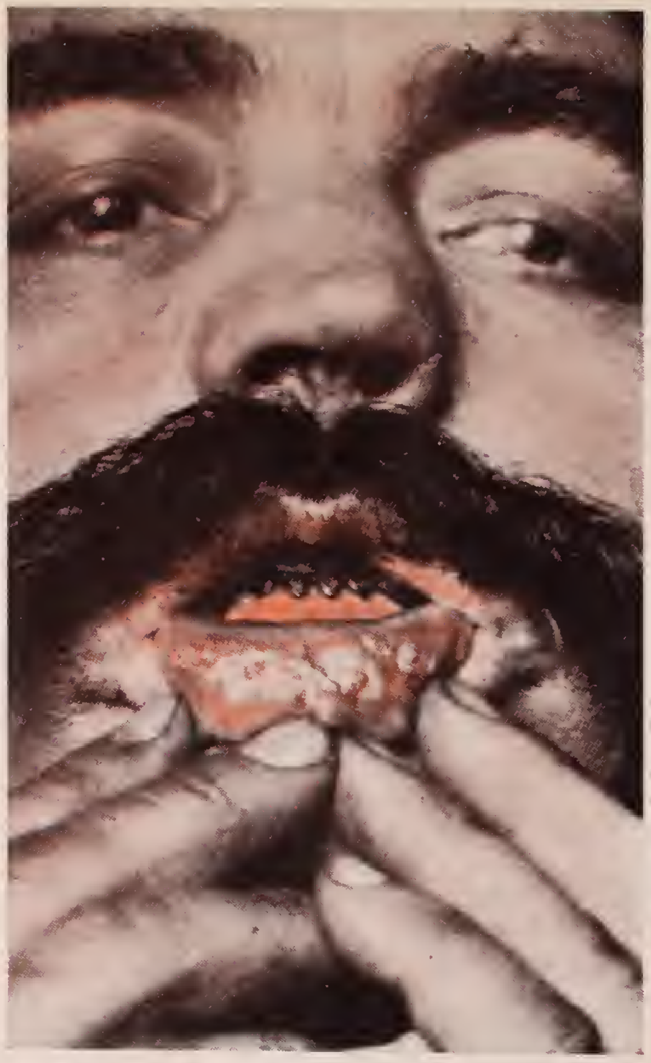

Fig. 16.—Cheilitis glandularis exfoliativa, a peculiar persistent inflammation of the lips (usually the lower) characterized by chronic inflammation and overdistention of the muciparous glands. Cysts are transparent and glistening in appearance, and on incision exude a thick, clear mucus.

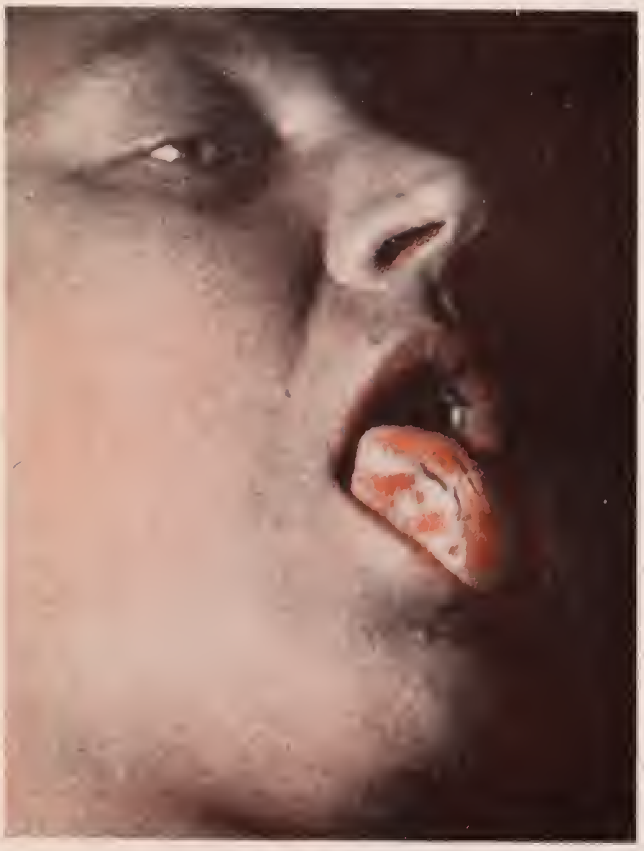

Fig. 10.—Leucoplakia of the tongue; post syphilis.

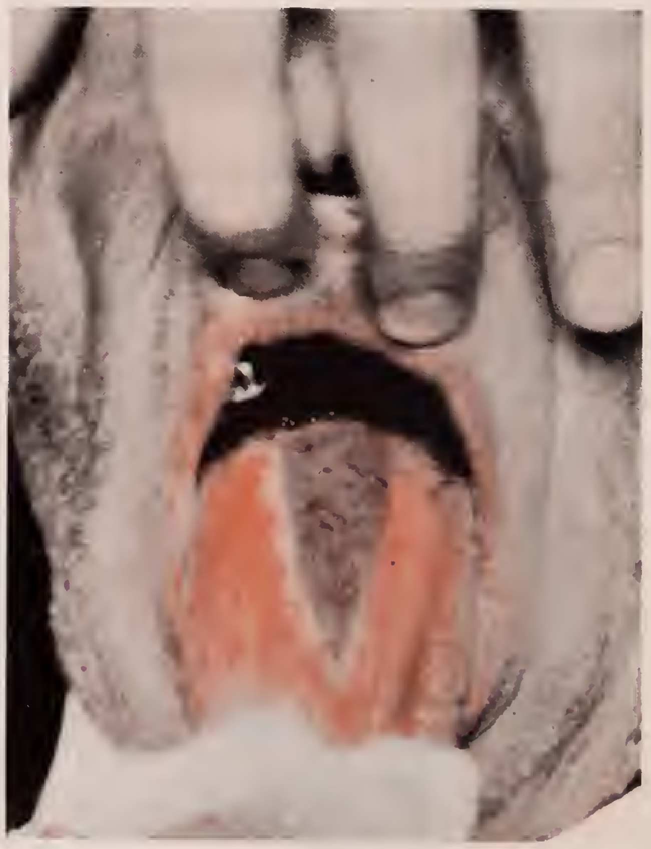

Fig. 12—Lingua Nigra; "black or hairy tongue," a common, early manifestation of malignancy of the tongue.

scarring from old, neglected syphilides must be protected carefully against further injury and irritation, and should be held under vigilant observation. On the other hand, the submucous scarring in interstitial glossitis is not a source of particular danger.

The earliest evidences of well-defined mouth cancer is usually shallow ulceration, scarcely larger than a split pea, with indurated base and edges and slightly rolled up or everted border; there is usually a history of extremely slow, early development, from a small pimple or roughened elevation. Occasionally it develops rapidly from a small, warty-like excrescence, which may have been present from birth or early infancy, or which may have suddenly made its appearance without any premonition.

LEUCOPLAKIA ORIS

Sometimes the mucous membranes of the cheeks, lips and tongue develop a tendency to take on a grayish-white coating, which is at times irregularly diffused, or decidedly patchy or flaky in appearance. This condition is called leucoplakia oris. It bears a close resemblance to the so-called leucoplakia of syphilis, except that the mucous membrane is quite smooth and is devoid of the scar-like irregularities of the latter process. (*Fig. 10.*) A serological examination will establish readily the identity in doubtful cases. The cause of this simple form of leucoplakia is very obscure. Syphilis and immoderate use of tobacco are accredited predisposing influences by many. On the other hand, leucoplakia is often observed in women who have never incurred an infection of syphilis, and who likewise are not addicted to the use of tobacco. Some of the cases probably are predisposed by chronic gastric hyperacidity, and to the local irritation incident to over-indulgence in pungent, acrid, highly-spiced foods and condiments. This condition may become exceedingly pronounced in extreme cases and not infrequently becomes transformed into well-defined malignancy. Its recognition and significance is within the pale of dentistry, with an incurred obligation of proper care and safe conduct.

PEMPHIGUS MUCOSA ORIS

At times a peculiar type of leucoplakia oris presents itself that beggars careful and proper classification. The leucoplakia is distributed mostly over the buccal mucous membrane, chiefly at the teeth line; occasionally it extends well upon the upper and lower lips. The leucoplakia is less diffused and more circumscribed than in simple leucoplakia. The grayish-white deposits are almost plaque-like or flake-like in appearance and rest upon an intensely bright red mucous membrane, which is extremely congested and bleeds readily upon slight irritation. The whitish plaques contrast strongly with the adjacent strongly-congested mucous membrane. (*Fig. 6.*) The cause is exceedingly obscure, the course very chronic and persistent and treatment very ineffective. Most authors classify it with leucoplakia. Max Joseph, of Berlin, has termed it a pemphigus mucosa oris, which I hold is well taken because it bears a deceptive, virtually indistinguishable resemblance to pemphigus, a peculiar, blister-like affection of the skin, whenever this disease, as frequently happens, involves mucous membranes. Furthermore, it has come to the writer's notice that this so-termed pemphigus of the mucous membranes, after its primary development and years of limitation within the mouth, has eventually extended itself to the skin and assumed in time all the clinical features and characteristics of a well-defined case of primary pemphigus vulgaris of the skin.

There is one type of pemphigus, so-called pemphigus vegetans, which invariably begins at the muco-cutaneous borders, at the principal orifices of the body. It very commonly occurs on the lips in the form of small blisters, which soon break and whose base is soon covered with luxuriant vegetations; the superficial ulcerations extend rapidly into the mouth, outwardly over the face, and are painful, difficult to keep clean and bleed readily. Within the mouth they resemble somewhat closely the mucous membrane lesions of pemphigus in general. It is a very severe and often fatal affection. Pemphigus of the skin and mucous membrane is always a disease of greatest gravity.

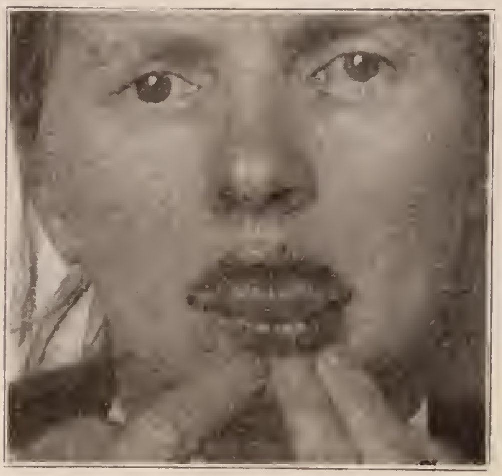

Fig. 7—Pemphigus vegetans, a peculiar dermatosis situated for the most part around muco-cutaneous orifices such, as mouth, nose, genitalia and rectum.

GEOGRAPHIC TONGUE, OR TRANSITORY BENIGN PLAQUES

This is a somewhat uncommon, but not altogether rare affection of the tongue, characterized usually by several somewhat large, irregularly round patches with a rather bright red border, and grayish-white periphery and with fading and somewhat scaly central areas. (*Fig. 8.*) The affection is most frequently observed in young children, but once established is prone to persist with remissions and exacerbations into advanced adult age; its occurrence by no means is exceptional. The individual attacks begin at monthly or many monthly intervals in the form of one or more bright red spots, with enlarging borders and somewhat intensely congested and fading grayish-yellow desquamating centers. A few isolated patches, within a short period of time, will overrun almost the entire tongue, producing varied superficial configurations which have been likened to "islands and continents," and have imparted to the affection the name of geographic tongue. The patches cause but slight subjective discomfort and disappear spontaneously without medication in relatively few days. Their unheralded advent, mild course and spontaneous disappearance also have merited for them the cognomen of transitory benign plaques. Transitory benign plaques possess some noteworthy interest to the dentist. They often are mistaken by the dental and medical profession for mucous membrane evidences of syphilis. Syphilitic plaques usually are much smaller, more ulcerated and painful and with more inflammatory borders and yellowish centers. Transitory benign plaques are present from birth or earliest childhood and show a chronicity comparable to congenital affections in general. The cause is somewhat obscure; aside from their innate character the relapses are doubtless ushered in by attacks of indigestion, incident to hyperacidity and dietary indiscretions.

LINGUA PLICATA, OR FURROWED TONGUE

A somewhat more common congenital affection of the tongue is so-called lingua plicata, or furrowed or scrotal tongue. It is characterized by one or more central longitudinal furrows traversing the dorsal aspect from the tip of the tongue to the circumvallate papillæ with numerous transverse clefts and intervening ridges extending peripherally towards the lateral edges. The peculiar appearance produced by these somewhat parallel alternate folds and furrows has elicited for the affection such synonyms as "cat's tongue," "scrotal tongue," "wrinkled" or "fluted tongue." It varies considerably in intensity in different individuals, sometimes being scarcely worthy of special note and again being very striking in character. It often affects many members of a single family group. When the clefts are unusually deep they are apt to become the site of a mild degree of local irritation from retained particles of food and general lack of cleanliness and asepsis. Aside from the danger incident to this form of irritation, if unduly prolonged, the condition possesses no special significance save that of an intelligent interpretation, and its differentiation from an interstitial syphilitic glossitis, whose deceptive resemblance already has been noted and described. Mouth cleanliness and asepsis, desirable under all conditions, is a particularly essential requisite in cases of lingua plicata in order to insure the patient against the dangers incident to chronic and unduly-prolonged local infection and irritations.

MUCOUS MEMBRANE NAEVI, OR BIRTH-MARKS

The mucous membrane of the mouth is subject to the same congenital malformations incident to growth and development as the skin and other tissues of the body. Therefore, occasionally we observe in the mouth the same changes which are generally termed birth-marks when they occur upon the surface of the body. Strictly interpreted, a "birth-mark" is a misnomer. A mark never is incident to child birth. Most marks are present before a child is born. Many so-called birth-marks make their visible appearance long after birth and increase or decrease in form and extent with advancing years. The most common form of birth-mark in the mouth is the so-called vascular nævus or portwine stain. It may be located solely in the mouth or, as is more commonly the case, it can be traced directly through the cheek from skin to mucous membrane, or may transgress directly over the muco-cutaneous border. The mucous membrane nævus presents a smooth surface, the fundamental change being an abnormal increase of vascular tissue. Not infrequently the red birth-mark of the mouth, same as that of the skin, may be distinctly warty or papillomatous in character. In that event the mark is called a raspberry birth-mark. Such a papillomatous or warty mark may be entirely devoid of undue vascularity, in which event it is termed a papillomatous nævus. Both the vascular and non-vascular papillimata are prone to grow and to become irritated and inflamed from local and mechanical causes, and like their cutaneous prototypes, are very apt to undergo malignant change. Their early, careful and proper removal is a prophylactic requisite. The smooth vascular nævi merit no therapeutic consideration unless from a purely cosmetic standpoint.

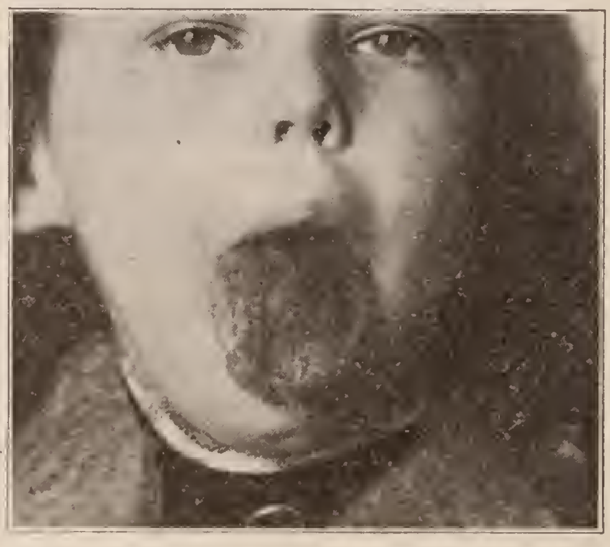

Fig. 11—Vascular nævus of the tongue (birth-mark), usually present at birth or in early infancy and subject to malignant change.

TUBERCULOSIS MUCOSA ORIS

Tuberculosis of the mucous membrane of the mouth, considering its frequency elsewhere in the human system, is exceedingly rare. It virtually never occurs primarily over this area and is secondary to foci located elsewhere. It occurs most frequently as the result of a direct transgression over the muco-cutaneous border of skin tuberculosis in the form of lupus vulgaris. The cutaneous characteristics are maintained and preserved when implanted upon the mucous membranes. We see the same well-defined patch with distinct marginated border, studded with deep-seated, yellowish-red nodules. The same degree of chronicity, nodular ulceration and cicatricial destruction are in evidence as upon the skin. Its associated and unmistakable presence upon the skin renders it easy of recognition. Tuberculosis orificialis, or mucous membrane tuberculosis, secondary to deep-seated infection such as pulmonary tuberculosis, is more difficult of recognition. (*Fig. 9.*) Fortunately it is rarely present within the mouth. It owes its presence to the direct entrance of the germs into some tiny abrasion in an individual whose mouth secretions contain tubercle bacilli from some other focus of infection. It begins, therefore, as a small superficial, painful ulceration with bright-red base and soft, flabby undermined congested edges. The base is covered with soft granulations which bleed readily and which, on closer inspection, are studded with grayish-yellow tubercles, pin-head in size. The ulcer enlarges slowly and steadily, shows little or no reparative tendencies and steadily becomes more and more painful. Presence of bacilli in the sputum and evidence of associated pulmonary tuberculosis are confirmatory. Associated syphilis to which it bears some resemblance must be excluded.

LINGUA NIGRA; BLACK OR HAIRY TONGUE

Black or hairy tongue is a rare, unusual condition, characterized by yellowish, brownish or blackish patches situated as a rule immediately in front of the circumvallate papillæ, and extending forwardly along the median line and laterally toward the edges of the tongue for its middle third, sometimes covering two-thirds of its free surface with its patchy discoloration. In well-defined cases the patches possess a

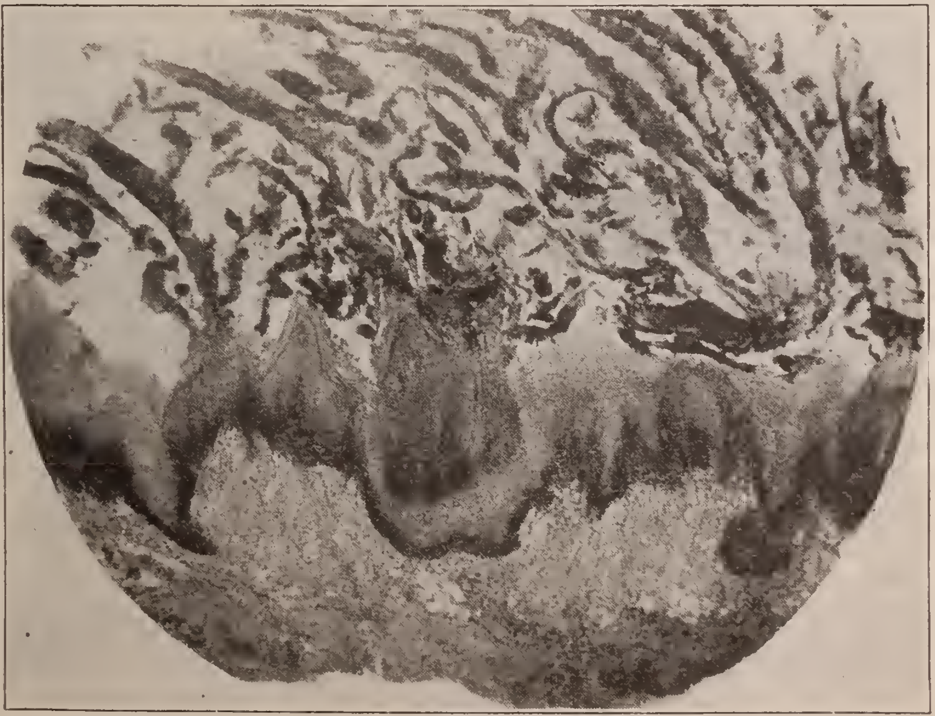

Fig. 13—Histologic specimen of hairy tongue.

soft, fur-like touch and appearance, and if gently examined with forceps, are observed to be made up of an inextricable mass of cosely-interwoven, hair-like filaments, measuring a half-inch or more in length. (*Fig. 12.*) In arrangement and distribuution they recall to mind the appearance of a field of growing grain, extensively devastated by wind and storm. Upon close examination the individual filaments, bear a very deceptive resemblance to ordinary short hairs. The illusion easily is dispelled by microscopic examination which reveals the filaments to be abnormally elongated filaform papilæ. (*Fig. 13.*) Some of the filaments show several terminal bifurcations; (*Fig. 14*) others give off lateral leaf-like branches and preserve for themselves the appearance of a stalk of Indian corn. (*Fig. 15.*) The affection aside from the disfigurement and its mechanical interference with taste and mouth cleanliness possesses at the most scientific interest. It readily merits recognition and some degree of intelligent interpretation at the hands of the dentist. The cause is shrouded with much obscurity. The vast majority of the cases observed by the writer, complicated incipient, and later a well-defined malignancy of the mouth, usually cancer of the tongue proper. It is probable that the filiform papillæ are stimulated to active proliferation and overgrowth by the subtle and still-unsolved cause of malignancy. Tobacco, syphilis, mercurials and acrid local agents are credited causal properties by some writers and possibly influence the result by their local action on the affected papillæ. Black or hairy tongue should not be mistaken for the commonplace coated and discolored tongues, which result from mouth neglect, tobacco, sordes of teeth, ingestion of acrid foods, drugs, etc. The papillæ in these cases are occasionally elongated to an eighth or a quarter of an inch, but the general characteristics of the affection are entirely lacking.

CHEILITIS GLANDULARIS

Cheilitis glandularis is a chronic inflammation of the mucous membranes of the lips, usually beginning in early life and persisting more or less indefinitely unless checked by successful treatment. (*Fig. 16.*) It is characterized by a more or less persistent swelling and redness of the lips, chiefly the lower, accompanied with some sense of burning, painful fissuring and slight scaliness. Mere cursory examination will readily reveal that most of the disturbance is centered in and about the muciparous glands. Some of the glands are so distended with their contents as to form readily visible superficial globular masses, which exude upon pressure or gentle incision, thick, glairy mucous. Others rupture spontaneously, leaving distinct crateriform depressions in and around their normally invisible follicular openings. The affection probably is due to some form of congenital anomaly. Its recognition is not difficult and it should not be mistaken for syphilis or anything of a grave or infectious nature. It should not be confused with cheilitis exfoliativa, which is a simple inflammatory affection of the lips, incident to almost any form of local irritation such as wind, weather, light, heat, acrid substances or anything of a mechanical nature which can inflame or irritate the mucous membrane of the lips by its direct or indirect presence. This condition virtually is an eczema or dermatitis and it must be borne in mind that the mucous membrane, though materially

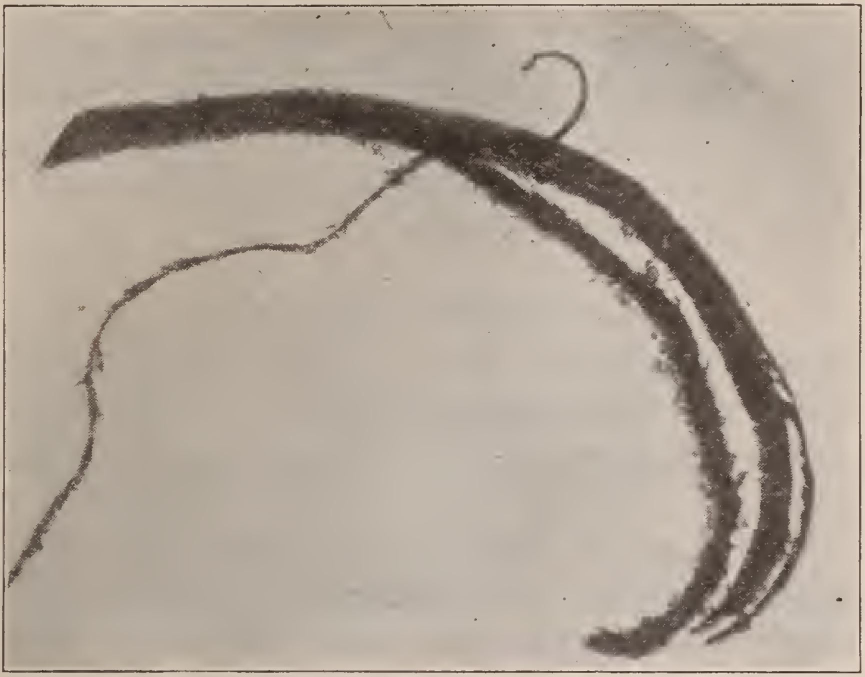

Fig. 14.
Microscopic specimen of hair from hairy tongue, showing characteristic fibricated extremity.

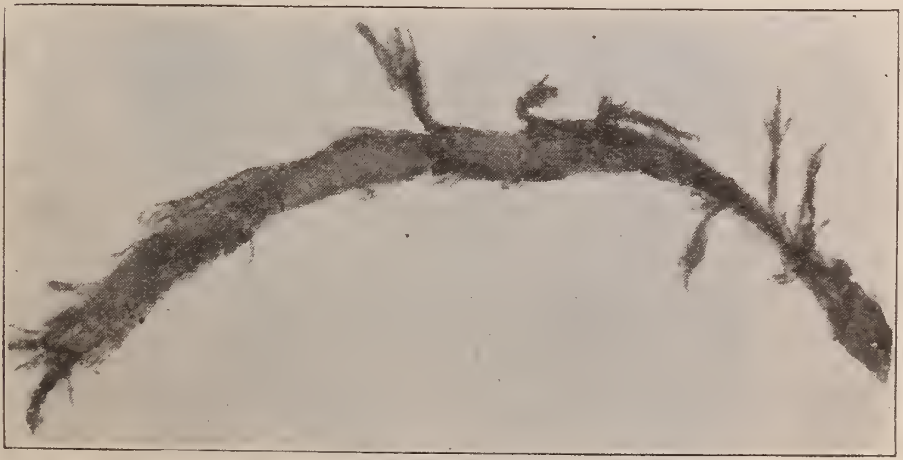

Fig. 15.
Specimen from hairy tongue, showing characteristic corn-stalk appearance.

more resistent and intractible than the skin, is subject to the same untoward influences and reacts in similar measure with the skin to the same local and general irritants. Therefore we frequently see cheilitis exfoliativa in individuals who exhibit areas of dermatitis and eczema elsewhere, particularly that mild, greasy, circumscribed form of eczema technically termed seborrhoic eczema, which occurs for the most part about the free borders of the scalp and around the ears, mouth and nose. Cheilitis exfoliativa is almost identical with chronically-chapped and inflamed lips, with a considerable degree of associated persistent peeling and scaling of the mucous membrane.

FORDYCE'S DISEASE

This affection is characterized by tiny pin-point, grayish-white concretions which are occasionally scattered over the vermilion border of the lips, but more frequently is observed inside of the lips and buccal mucous membranes. The tiny spots are always separate and discrete, but often are freely peppered over an affected surface. They are devoid of significance save for their trite disfigurement, and are rarely observed unless accidentally discovered upon close inspection. They owe their presence to an anomalous secretion of oil glands, and they are entirely analogous to the milium-like bodies or so-called white-heads that are commonly observed on the cheeks of some people.

AFFECTIONS INVOLVING SKIN PRIMARILY AND MOUTH SECONDARILY

In conclusion, there are a number of skin affections, namely, lichen planus, lupus erythematosus, (*Fig. 17*) psoriasis, etc., which as a rule affect the skin solely and primarily. Occasionally they secondarily involve the mucous membrane of the mouth, and exceptionally affect solely

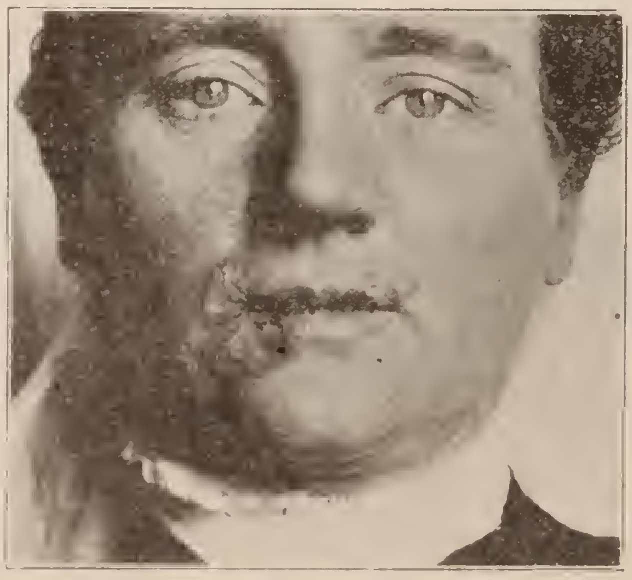

Fig. 17—Lupus erythematosus, an obstinate, persistent, slowly-spreading form of dermatosis of the face which occasionally extends over and upon the mucous membrane.

and primarily the mucosa oris. The study and recognition of these affections is attended with such technical difficulties that they are left where they strictly belong—in the province of dermatology. At least it will not be in the scope of this paper to give them special consideration. The writer hopes that some day they also will fall in the pale of dental stomatology so that the two specialities, dentistry and dermatology, can cordially extend to each other instructive, reciprocal and helpful aid.

19 West Seventh street.

PYORRHEA*

BY DR. FRANK H. SKINNER, CHICAGO, ILL.

PYORRHEA WORK is the hardest we have to do in dentistry. It requires patience, delicate manipulation, a knowledge of what we are doing and the confidence and co-operation of the patient. In order to secure the confidence and co-operation of patients, we must educate them to appreciate what we are doing, sufficiently to induce them to give all the home care necessary to complete the work we do at the office.

ETIOLOGY

Pyorrhea is caused directly by infectious substances which locate on the tooth surfaces themselves. Fermenting soft accumulations infect the gums and cause inflammation. There is always a serous fluid oozing from an inflamed surface. Serumal deposits, so called, are the precipitate from this serous exudate. This deposit may form at the apex of a root as the result of an apical abscess, on the side as a result of a lateral abscess or just under the free margin of the gum from gingivitis as in pyorrhea, and work rootwise. There are a great many conditions which predispose pyorrhea by lessening the resistance of the tissues, thereby making it possible for local infection to take place. Following are some of the most prominent:

Malocclusion, which causes bruising of the peridental membrane, is probably one of the principal predisposing causes. In the mouth of the average person who has reached thirty-five or forty years of age, some portions of the teeth have worn more rapidly than others, and the portions thus left high produce a side pressure, causing injury of the peridental membrane and absorption of the process or else forcing the teeth apart at the contact points, which allows fibrous foods to impinge the crest of the gum septum. In other words, such teeth do not occlude anatomically. Poor contact points probably rank second as a causative factor; next a lowering of the general vital resistance; then a great many minor causes, such as imperfectly formed enamel surfaces, enamel surfaces which have become etched from deposits left there until acid fermentation has taken place, fillings improperly finished at the gingival margins or fillings which cannot be made smooth, such as all of the phosphate and some of the silicate cements. All banded crowns and regulating appliances cause some irritation and a great deal, if carelessly fitted. Bands which fit, but which have been driven up until they impinge upon the peridental membrane, are also a great source of irritation.

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*Lecture delivered before the Iowa State Dental Society, 1917.

Pyorrhea also is found, almost without exception, where one tooth has been lost. For instance, when the first permanent molar has been extracted, there is a tendency for the space to become closed and for the opposing teeth to elongate. The teeth posterior to the space come forward as a result of the pulling on the fibers due to the formation of scar tissue where the tooth was extracted. In a short time, malocclusion produces a force which causes the remaining teeth to tilt still more, and in a few months, most of the stress of mastication is brought to bear on the under side of the tilting tooth, where the tissue has become bruised. Here also usually is found an accumulation which is a source of infection to the already injured tissues, and pyorrhea results. Unless the full space is maintained by the proper interlocking of the cusps of the remaining teeth, I believe it is perfectly legitimate to cut into the tooth at each end of the space and insert a bridge, preferably of the spur and inlay type. This method of making a short bridge maintains the space and occlusion, and yet allows normal movement and function of the teeth in the alveolus without the danger of loosening the inlays. I do not believe in removing pulps when it possibly can be avoided, but should it be necessary, the tissues surrounding the teeth should be made healthy beforehand.

THE TEETH AND THEIR SUPPORTING TISSUES

The tooth is composed of the dental pulp, dentin, cementum, which covers the root, and enamel which covers the crown. The dentin is filled with canaliculi, which, in the crown, extend to the inner portion of the enamel, sometimes even permeating it, and in the root portion, they extend to the cementum, occasionally pass clear through it and form canals of greater or lesser size which connect with the peridental membrane. The outer surface of the cementum has a rough, pitted, irregular surface to which the peridental membrane and dental ligaments gain very firm attachment. The density of the cementum is greatest just under this rough surface. At the cemento-enamel junction, the cementum is very thin, but increases considerably in thickness as it approaches the apex of the root. Between the dentin and the cementum, is the granular layer of Tomes. In the cementum of the apical third, there are many spaces known as lacunæ. Although it cannot be demonstrated with a microscope and is disputed by many, some authorities believe the lacunæ have direct connection with the dental tubuli, which, of course, would mean that they were directly connected with the dental pulp. Sealing in twenty-five per cent. ethereal pyrozine illustrates this.

The teeth occupy sockets in the alveolar process, which is a bony support formed around the teeth as they erupt. It is very porous, spongy, has thin edges and is somewhat of an insecure framework for supporting the great stress of mastication brought to bear upon it. The teeth are suspended in these sockets by dental ligaments, some of which run obliquely upward, forming a sort of hammock, and are attached to the process by fibers which spring from the cementum and appear in bundles. The cementoblasts build up the layers of cementum and then calcify both the latter and the fibers, which, in this way, become attached very firmly to the root surfaces. A short distance from the surface of the root, they usually break up into smaller bundles, which anastomose and interlace, passing around blood vessels and other fibers and again uniting into large bundles for attachment at their other extremity. These bundles of fibers or ligaments gain very firm anchorage in the alveolar process, and some bundles gingivally to the crest pass from the proximal side of one tooth to the proximal side of the adjacent tooth. Through the mucous membrane and vessels which pass through the alveolar process, the peridental membrane is supplied very plentifully with blood. The blood vessels pass over the crest of the process, as well as through it, and permeate the peridental membrane. Any inflammation at the crest of the gum usually causes some sclerosis, thus shutting off a part of the blood supply.

SUSPECTED AVENUES OF INFECTION

There are certain glandular structures in the peridental membrane which have been beautifully described by both Black and Talbot. These glandular cells, also called epithelial cells, are in direct connection with channels leading into the mucous membrane and alveolar process. Any infectious material on the teeth or accumulating between the teeth at the free margin of the gum has an uninterrupted avenue of entrance into the deeper structures. Micro-organisms, introduced into the tissues through pyorrhea pockets or blind abscesses, when not taken care of by leucocytes or anti-bodies, travel uninterruptedly to where they are taken up by the circulation and distributed to points of lessened resistance, where they form colonies and produce different diseases, according to the organs infected.

The absorption of micro-organisms and their circulation in the blood stream, into which they are introduced through the tissues surrounding the teeth, are, today, considered responsible for many diseases. The micro-organisms are carried by the blood stream to the joints, heart, kidneys or other organs, where they produce destructive changes which, for a great many years, were unaccounted for. Research workers have compared the bacteria taken from tooth surfaces, their surrounding tissues and apical abscesses, with those taken from remote parts of the body, and found them apparently identical. In fact, it is known that bacteria are selective in the tissues which they inhabit. Those taken from an apical abscess of a patient with a diseased heart and injected into lower animals, if they fertilize at all, usually select the heart tissues for their habitation. We have had many instances of cultures of bacteria taken from blind abscesses or pyorrhea pockets and injected into rabbits or guinea pigs, producing the same pathological conditions in the animal as those from which the patient was suffering. Many systemic infections have been cleared up by the treatment of ill-kept mouths, and the extraction of abscessed teeth, followed by curettement of their sockets.

The canals leading from the inner wall of the gingiva into the deeper structures are demonstrated readily by the use of the Dunlop vapor. When this vapor is properly applied, these channels can be traced through the soft tissues and alveolar process for a considerable distance. I have introduced the vapor in the region of a cuspid, had it travel through the alveolar process and gum tissues and come bubbling out around the neck of a third molar. I have introduced it at a bicuspid on the right side, had it cross the median line and come bubbling out around the bicuspids on the left side. I have introduced it between the buccal roots of an upper first molar, and had it penetrate down into the tonsils or up into the forehead, showing that channels actually extend from the inner wall of the gingiva into deeper tissues, in almost any direction, following the line of inflamed tissue. In fact, according to Dr. Hartzell, the direct lymphatic drainage of the tissues surrounding the teeth is the most perfect of the whole body, affording a direct access to the deeper structures of the neck and mediastinum, thereby making it possible for micro-organisms introduced into the tissues through a pyorrhea pocket to travel uninterruptedly into the deeper structures of the body.

TREATMENT

Up to five years ago, the most successful treatment generally known consisted of the thorough removal of all deposits, peridental membrane and the rough outer surface of the cementum down to the hard layer, wherever the soft tissues had lost their attachment, followed with the best polishing possible, and then with maintained cleanliness. In seventy-five per cent. of the cases the congestion would disappear and the swollen tissues recede to where the peridental membrane was attached to the teeth, if the work were thoroughly done. Usually, by the slight proliferation of bone cells and the formation of scar tissue, the teeth were held very firmly for years. If prophylaxis were kept up, a reinfection of the tissues was not liable to occur. In nearly every case, it was possible to stop suppuration and produce apparent health in the tissues surrounding these teeth, but it was necessary to splint or anchor all loose teeth in order to maintain them with any degree of permanency. In extensive cases, some form of removable bridge work which forms a positive splint is absolutely necessary. I believe the time will come when those working for the best in dentistry will do away with all forms of extensive, fixed bridges.

Since the introduction of the Dunlop vapor, the procedure in the treatment of pyorrhea has differed somewhat, and now I am combining this vapor with the use of the planing instruments.

A great many patients whose mouths show no inflammation at the gum margins have osteitis or osteomyelitis, which results in the disintegration of absorption of the alveolar process. Red or cyanotic areas high up on the gums indicate diseased conditions and lowered vitality, and in periods of cessation of oral prophylaxis, the result is infection, suppuration and pyorrhea. The Dunlop vapor, if understood and properly applied, will reach these congested areas. If recognized in time, the development of pyorrhea can be prevented by establishing oral prophylaxis, eliminating all irritation and building up nature's resistance by the use of the paste and vapor.

In the treatment of advanced cases of pyorrhea, I first inject Dunlop pyorrhea paste into all pockets, then remove deposits and stains from every portion of the tooth not covered by the gums and polish all roughened, etched or undeveloped enamel surfaces. This sometimes requires several sittings. This scaling and polishing should be carried a millimeter or two under the free margin of the gums, but at this time I do not attempt instrumentation in deep pockets. Crowns, bridges, carelessly-finished fillings, unsavable teeth or any other irritant which may be present must be corrected or removed. If certain cusps are too long and cause lateral stress on any of the teeth, when the jaws are brought together and the teeth gritted from side to side, and if the teeth cannot be depressed into the sockets, the cusps should be ground so as to relieve all undue stress, because regeneration of tissues cannot take place while there is malocclusion. Poor contact points also must be corrected. If fillings which lack contact points are present, I frequently drill a little cavity in the filling and pack that with white baseplate gutta percha. This gradually gains space between the teeth and also forces the other teeth together, thereby re-establishing practically normal contact points, and when sufficient space has been gained, well-contoured fillings with good marginal ridges with proper occlusion should be inserted, and any cusps which interfere with proper occlusion should be ground. I especially speak of marginal ridges and fissure restoration because so many fillings instead of being built up with marginal ridges and fissures are inserted with flat surfaces which slope toward the contact point, thus producing force which tends to separate the teeth. Nature normally provides a high ridge near the point of contact, which forces the food toward the occlusal fissures, and unless we follow out this thought in our repair work, there is sure to be trouble sooner or later.

After all debris has been removed from the teeth and the coronal surfaces thoroughly polished, including a millimeter or two just under the free margin of the gum, I spray the mouth with ethyl-borate and reinject all pockets with the paste and use the pocket packer. The next day, it will be noticed that a gread deal of inflammation has disappeared, and the patient will say his mouth feels better. Then I begin using the Dunlop vapor treatment, which consists of introducing borated oxygen gas into the tissues by means of a very delicate, blunt needle. Penetration of the tissues by the vapor can be detected in three ways: First, by the flashes seen as it passes through the little channels; second, by a crackling sense of touch to the finger and third, the sensation felt by the patient. Only the smallest amount that can be detected in any of these three ways should be given at the first treatment, which should be given around the second molars and the cuspids. The tissues should never be punctured with this needle. By passing it just under the free margin of the gum and then bearing outward a little, the vapor will find openings in the soft tissues. These are little culdesacs, ducts or glands, which Dr. Talbot describes in his "Interstitial Gingivitis." One will be surprised to see the distance the vapor will penetrate, wherever inflammation exists. The needle should never be carried to the bottom of deep pockets, nor should it be used against tissue in which new granulations are beginning to form, because if we once break up or blow out newly-granulating tissue, fresh granulations will have great difficulty in reforming. It is advisable to give a treatment every day for five days in succession, then let the tissues rest for ten days or two weeks, when another series of five treatments should be given. The vapor should always be introduced into the more healthy areas and allowed to penetrate through them to the diseased portions.

Within three or four days, accumulations will begin to gather on the teeth. After the vapor treatment has been administered, paint the teeth with the disclosing solution, and after rinsing the mouth, let the patient see, by the use of a hand mirror, how rapidly infectious accumulations, as evidenced by the stain, have gathered on his teeth. At this point, I begin to teach him how to take care of his mouth. In order to prevent reinfection, it is essential to prevent this debris from gathering on the tooth surfaces. The patient is provided with a kuroris, or cotton carrier of some sort. I prefer the kuroris, because it is especially designed for this purpose, and the handle end can be used as a tongue scraper. He is provided also with a polisher, dental tape, mouth mirror and a supply of cotton rolls, and many patients even wish to use the disclosing solution.

It requires perseverance to teach some patients to use this outfit, while others learn to handle it very rapidly, but a dentist must be able to use it in his own mouth before he can be successful in giving instructions in its use. I do not believe that we have the ability to induce our patients to do that which we are not able to carry out ourselves, and I always feel that a man who is giving advice to patients which he is not carrying out for himself is not really sincere. Patients feel this, and his arguments lack force, if he is not actually doing the work for himself.

Until the teeth are smooth and while new tissues are forming, I do not advocate vigorous rubbing of the gums with the cotton rolls or brush, because if the tooth surfaces are not smooth, rubbing the gums intensifies the irritation, and if new tissue is forming we are liable to destroy it and thereby arrest the repair work; also the formation of new bone cells around the teeth is restricted by the hastened contraction of the tissue around the necks of the teeth, as a result of hard rubbing, but the tooth surfaces themselves should be kept clean by the use of cotton rolls, cheese-cloth napkins or wooden points. The proximal surfaces should be cleaned with tape. A reasonable amount of brushing immediately after each meal, with the use of the dental tape between the teeth, will remove most of the loose debris which accumulates.

I want to go over my patients' teeth with a polisher once or twice a week or have them do so. This is essential to prevent reinfection during the healing process. The paste and vapor stimulate circulation and reduce inflammation, and the paraffin pocket packer protects the tissues while healing. Occasionally deposits seem to soften or will detach themselves from the teeth with very little pressure. In these cases, I expect a true reattachment of the tissues to the peridental membrane. In other cases, they seem to produce little or no effect, except to reduce the inflammation and make the mouth feel more comfortable. After a couple of weeks of vapor treatment and cleanliness, if suppuration has not ceased, I begin surgical treatment of the roots, but in all cases, at this stage of procedure, I want to remove the deposits only, trying not to injure the peridental membrane, for we are working for a reattachment of the gum tissues and their return to normal conditions.

This vapor has an affinity for diseased tissues, and it is surprising to see how it will penetrate those which are either soft or bony. It cannot be forced into healthy tissue. Red or cyanotic areas located on the gums, well away from the teeth, indicate osteitis or osteomyelitis, and always can be reached by this treatment when properly applied. It establishes more comfort for the patient, produces hyperemia and apparently stimulates circulation.

SURGICAL INSTRUMENTATION

In some cases, the use of the Dunlop preparations apparently causes no change in the deposits or their attachment to the teeth. In these cases, thorough instrumentation is indicated.

A good many of the so-called pyorrhea instruments on the market would make better gouges and chisels than dental instruments. A great many men fail in pyorrhea work on account of the selection of instruments which are not delicate enough to do the work and which are improperly shaped. More depends upon the man than on the instruments, but any man will do better work with properly designed instruments which he has learned to handle correctly than he will with certain classes of instruments which have been forced upon the profession for years. The planing instruments are in a class all by themselves. I would not recommend that any man purchase a set of these instruments without taking a course to learn how to handle them.

Next to the planing instruments, I would recommend the Younger set, but with these it is frequently necessary to use local anesthetics hypodermically. This usually causes soreness of the tissues which may last for a few days or a few weeks. I do not believe the tissues ever recuperate as quickly after hypodermic injections as they do without them.

From the histology of a tooth, one can readily see that an instrument which removes a very thin, delicate shaving and leaves a smooth surface, such as the planing instruments, should be used, for they cannot be made to cut deeply, and are adaptable to any shape of root surface, with the exception of the sharp angles where roots bifurcate, in which case an instrument of the Younger type is preferable. When the planing instruments have been used, soreness usually leaves the soft tissues quickly. In some cases, where tissues have been badly lacerated from the use of improper instruments, patients have been ill from anaphylaxis, or the hyper-susceptibility to the action of toxins introduced into the tissues and absorbed. The planing instruments are shaped so that they extend to the bottom of pockets and yet cause very little laceration of the tissues.

All etched or roughened enamel surfaces adjacent to soft tissues must be made smooth and polished. Then all deposits should be removed, and the necrotic peridental membrane and the irregular outer surface of the cementum should be planed to the hard layer. This is absolutely essential where the soft tissues do not reunite to the peridental membrane and close the pocket, because millions of bacteria will propagate in the dead peridental membrane and other debris which adheres to the irregular, pitted surface of the cementum. Leucocytes form a very dense wall, which, in a large measure, protects the soft tissues from the infection of micro-organisms. Leucocytes possess amœboid movement, but they are unable to cross over from the soft tissues to the infected root surface in sufficient numbers to cope with the millions of bacteria which grow on improperly cared for tooth surfaces. The leucocytes in the soft tissues adjacent to pyorrhea pockets gradually die, and in connection with broken-down or degenerated tissue, are thrown off in the form of pus.

Therefore, it is absolutely essential, where thorough instrumentation proves necessary, that all root surfaces should be planed to the hard layer, but care should be taken not to go through this hard layer, for just underlying it in the middle third we run into the granular layer of Tomes, or at the apical third, into the lacunæ, either of which, if opened, exposes hypersensitive surfaces and spaces where millions of bacteria will again propagate. With proper instruments, it is very easy to tell when this hard surface is reached. To quote from Dr. Hartzell: "In planing off lime salt deposits the instrument feels as if it were scraping over unpolished marble. In planing off the necrotic periosteum the sensation is that of pulling the instrument over silk velvet. A few strokes will remove this, and we then come to a hard but rough surface. With a few strokes of a sharp instrument over this surface, the sensation is that of rubbing a burnisher over polished ivory. This is the time to stop, for we have reached the hard layer which lies just under the rough surface of the cementum. If we are unfortunate enough to plane through this layer the instrument will begin to jump. This indicates that we have cut too deeply and have done as much damage as we have done good, for these areas are large enough to harbor millions of pus-producing bacteria."

If the patient should be negligent about his mouth and deposits should get started again after the work has been thoroughly done, instruments which do not cut should be used on the surfaces which already have been planed, for we do not want to take any chance of cutting through the hard layer. The little files known as "Smith trimmers," or those designed by Drs. Hartzell, Tompkins, Hutchinson, Towner and many others, are probably the best adapted for secondary treatment. They soon lose their edge, thus eliminating the danger of cutting too deeply, yet they will remove deposits from a smooth, hard surface.

Many cases of pyorrhea can be cured by thorough instrumentation. The Dunlop preparations, properly applied, greatly increase the percentage, and I believe where it has been used as heretofore described and where some of the fibers of the peridental membrane still retain their vitality, the attachment of tissue will take place much nearer the neck of the tooth and less instrumentation will be required to obtain good results. Cases which do not respond to these treatments usually are complicated with some systemic disease which should be diagnosed and corrected. Diabetes, Bright's disease, intestinal toxemia, pernicious anæmia and, in fact, any of the slow, chronic, debilitating diseases so reduce the general vitality that tissues do not respond as readily as they should. Often in cases of this kind, oral conditions will respond immediately upon correcting the systemic disorders, but very often the systemic disorders are corrected when the oral cavity is put in a hygienic condition and cleanliness maintained.

Vaccines have proven of value in some cases, but I believe when a vaccine is used it should be autogenous.

There is a form of suppuration which is frequently mistaken for pyorrhea and for which one should be on his guard, i.e., where an apical abscess has opened along the side of a root and is discharging at the neck of the tooth. Sometimes these will respond to vapor treatment, but frequently it is necessary to open the gum, excise the apex of the root and curette all necrotic and carious bone. Plane the root thoroughly, as you would in a pericemental abscess, then pack with gauze and euroform paste and make the opening heal in from the bottom. We do not always get the results we hope for from this treatment, but it usually stops the destruction of bone and will make the tooth useful for a number of years.

Patients should be informed that pyorrhea is the result of bacterial growths which have been allowed to form and remain on the tooth surfaces. They also should be told that their teeth will require constant care in order to maintain a healthy condition after the pyorrhea has been cured, and that this cure can be maintained permanently only with their co-operation, because the same cause will produce the same result again.

While the tooth brush, in a large measure, is a failure in preventing decay and pyorrhea, I am not quite ready to eliminate it as a toilet article, but I am very particular as to its shape and its manner of use. Too gritty a powder which will wear away the teeth, especially where the gums have receded, should not be used. Never allow patients to prick their gums with the bristles of a brush, for tooth bristles are never sterile and injured places on the gums form points of entrance for infecting organisms, and later will result in scar tissue, which contracts, thereby starting recession of the gums. Small brushes are preferable to large ones. Also have patients practice brushing their teeth before you until they learn to handle a brush correctly. You will find that they have acquired the habit of starting to brush in one place, usually at the gingival margins of some of the anterior teeth. This can be detected in its early stages by a slight recession of the gums above the teeth where the brush is first placed. Later on this cannot escape our notice, because at this point the gums have receded and grooves have been cut in the teeth. Usually patients will tell you this is erosion, but this kind of erosion stops when they desist from using gritty powders and from starting to brush at the same point.

The chief benefits derived from the use of a tooth brush are that it acts as a series of fine tooth picks, thereby removing a part of the loose debris, and that the massaging produces a more healthy condition of the gums. Massaging of the gums, however, can be carried to excess. I do not like to see the gums present a hard, leathery, mottled, pink surface, for this calloused appearance is the result of severe rubbing. There is not good circulation, and infection followed by serumal deposits usually occurs sooner or later and works rootwise under this kind of tissue. Gum tissue should lie over well-formed bony structure and should have a good, bright, healthy color and a net work of fine capillaries showing plainly just under the surface. I do not mean hyperemia, but just a good healthy circulation. As far as I have been able to observe, daily massaging with cotton rolls or cheese cloth napkins increases circulation, but does not cause the gums to become calloused. It is better to take tooth brushes away from patients, if they cannot learn to handle them properly, and have them depend upon the polisher, dental floss and cotton rolls, for with these they will not injure their teeth or gums.

With the aid of a looking glass and a mouth mirror, a patient can see foreign substance on his own teeth by applying the disclosing solution. Polishing with wooden points will remove all soft accumulations located by the stain. When necessary, patients are allowed to use an abrasive, such as Pepsodent tooth paste, precipitated chalk or a fine silex preparation. I have not used pumice stone in my practice for many years, because it does not polish highly enough to inhibit the formation of bacterial plaques.

Some patients are able to maintain clean tooth surfaces for six months or even longer, while others, who will not try or who have not the ability, need to have a prophylaxis treatment every thirty days. We must find out how long they are able to keep their mouths in a clean, healthy condition, and then establish that length of time as a period for prophylaxis treatments. In this work, it is necessary to notify patients when they are due, and when informed of the plan used for keeping in touch with them, they invariably wish to be put on the call-up list.

The results obtained by those doing prophylaxis work may not coincide in every way with scientific theories, but are obtained clinically, and clinical results are convincing and are what we are after.

Dr. Loeb, in his book, "The Mechanistic Conception of Life," says: "Life of warm blooded animals—man included—ends with cessation of oxidation in the body. As soon as oxidations have ceased for some time, the surface films of the cells, if they contain enough water and the temperature is high, become permeable for bacteria, and the body is destroyed by micro-organisms."

We cannot think of a more favorable place for the breaking down of tissue cells than is found in the alveolar process and gum tissues, where there is moisture, body temperature, lack of oxygen and poor return circulation. The Dunlop vapor furnishes oxygen to these congested parts, promotes normal cell activity and thereby growth. The hemoglobin of red cells absorbs oxygen wherever it can get it. The vapor immediately restores the bright red color which oxygen gives to blood, and stimulates circulation, thus supplying food upon which the newly-formed cells exist. By pressure, it forces micro-organisms and their toxins out into the healthy tissue, where the leucocytes have an opportunity to combat them, and wherever it carries these micro-organisms, it also places the borated oxygen vapor, which produces active hyperemia, thereby adding to the vitality of the parts. This has the effect of autogenous vaccine, which produces anti-bodies. These anti-bodies add vital resistance to the system by raising the opsenic index against the infecting organisms.

Pickerill criticises the polishing of tooth surfaces for fear of mechanically removing Nasmyth's membrane, through which, after the eruption of teeth, he claims the outer layer of enamel is being constantly calcified.

The Nasmyth membrane theory I believe to be a fallacy, because this membrane from which the enamel is formed wears off within a few months after the eruption of the tooth. There is very little question, when the teeth are placed in a proper environment and oral prophylaxis is maintained, but that the outer surface of the enamel becomes much harder.

Some time ago I had the privilege of going through Dr. Bunting's laboratory at the University of Michigan, where he is carrying on a great deal of experimental work. As yet, he is not ready to say how it takes place, but is satisfied that the teeth which have been given monthly prophylaxis treatments for a year or more have a very much harder surface than teeth which have been ground to that same polished surface at one sitting. He has arrived at this conclusion by comparing the depths to which silver nitrate penetrates the enamel of the two. The theory is advanced by some that this is accomplished through the condensation or compression of the enamel rods from the mechanical rubbing of the outer surface of the tooth. To me this seems hardly feasible. According to Pickerill, Bunting and other investigators, it is probable that lime salts are deposited on the outer surface of the enamel. The teeth are constantly bathed in saliva, and when this is sufficiently charged with calcium salts, it is supposedly depositing these salts in the outer surface of the enamel. When a tooth surface is kept free from bacterial plaques, one of the functions of the saliva is to preserve, if not to increase its calcium content, but when the surface is covered with bacterial plaques, not only is the saliva kept away from it, but acid fermentation is taking place on that surface all the time, and the acid so formed is constantly drawing upon the calcium salts in the enamel to neutralize itself.

Prophylaxis is saving teeth today, and is improving general systemic conditions, and I hope that every practitioner here will be stimulated to put as many of his patients as possible under the oral prophylaxis regime, for every dental practitioner should be a specialist in oral prophylaxis and pyorrhea work. If he is watching for and treating pathological conditions of the oral cavity, he cannot help but study the conditions which cause its disease, and if he learns to recognize and remove the cause of dental troubles, he is practicing prophylaxis. I do not believe that we need more pyorrhea specialists, but we need more general practitioners who recognize conditions which, if not corrected, will produce pathological results. I believe that the pyorrhea specialist who does nothing but pyorrhea work and sends the patient back to the dentist, who in the first place was unable to prevent the development of the disease, will not be a permanent fixture nor a success in the dental profession, because a man who is not treating these conditions does not realize the causes which produce them. A great deal of dentistry allowed to pass in our dental schools is responsible for many of the pyorrhetic conditions we meet.

I hope we shall all live to see our great institutions of dental education stimulating in the student body as much or more interest in oral prophylaxis measures than the major portion of it now takes in prosthetic dentistry.

72 Madison St.

I AM NOT BOUND TO WIN, BUT I AM BOUND TO BE TRUE. I AM NOT BOUND TO SUCCEED, BUT I AM BOUND TO LIVE UP TO WHAT LIGHT I HAVE. I MUST STAND WITH ANYBODY THAT STANDS RIGHT, STAND WITH HIM WHILE HE IS RIGHT AND PART WITH HIM WHEN HE GOES WRONG.

—*ABRAHAM LINCOLN*

PRESIDENT'S ADDRESS*

BY F. M. CASTO, M.D., D.D.S., PH.G., CLEVELAND, OHIO.

IN CALLING TO ORDER the fifty-second annual meeting of the Ohio State Dental Society, one is reminded that since our meeting last year many things have happened, nearly all conditions have changed. Our country is passing through the greatest crisis in its history. We are living in a different age, as it were, and our mental attitude towards life, its pleasures and vicissitudes, has changed materially. It has been a most remarkable year, a year which has marked an epoch in the history of our profession, of our country and of all of its activities. The dental profession has appealed for and has been favored with much recognition. The status of dentistry has been raised to a standard which will be most difficult to maintain. New and favorable laws have been made. Dentists have been placed in more responsible positions. There has been a closer relationship created between the dental and medical professions. Dental sections have been established in base hospitals. The field of dental surgery has been extended. Dentistry has been included in the general scheme of welfare and safety departments in the large industrial plants. It has been given recognition on State Boards of Health, on various war boards, on the General Medical Board of the Council of National Defense, and on the Division of Medical Supervision of the Section on Sanitation of the Committee on Welfare Work, which comes under the supervision of Samuel Gompers, chairman Committee on Labor of the Council of National Defense. In fact, it has become such an important consideration in the general health and welfare of the nation that representation has been provided for wherever this question has been involved.

The whole nation has thrust at us a challenge, a challenge that we prove and make good our many claims; so today we are standing at the threshhold of success or failure. We must meet the challenge; there is no escape. We are heavily laden with responsibilities as a profession and as individuals; we must work hard, energetically, more efficiently and in greater unity than ever before. Every man must do his duty two-fold and more. All resources of the profession must be mobilized and placed at the disposal of the nation. Then, and only then, will our efforts be crowned with success. I consider it most fortunate to have been chosen to administer the affairs of this society during such an unusual period. I thank you for the honor and wish to express now my grateful appreciation. My policy since assuming the responsibilities encumbent upon the office has been unprejudiced, and I have endeavored to deal with fairness to all and favor to none.

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*Read before the Ohio State Dental Society, Cleveland, December, 1917.

The result of the work is now submitted for your consideration, as you can best judge of its value.

On behalf of the officers and committees of the state society and of the profession of Cleveland, I wish to extend a most hearty welcome to all. It has been our hope and desire to make this meeting profitable. There has been a complete co-ordination in the work of all committees, and I believe that every member of every committee has been given an opportunity to do and has done his bit. All are doubly anxious to make this meeting a success. About twenty-five years have elapsed since the society met in Cleveland and we think it should come more frequently.

The program committee, of which Dr. W. H. Whitslar is chairman, has done masterful work, the results of which will now accrue to your advantage and benefit.

The clinic committee, of which Dr. W. A. Price is chairman, has done likewise, and will present for your consideration and enlightenment a "Seminar;" in other words, it will be a clinical demonstration of facts as have been proved by the persons presenting them. It was a giant task for these committees to secure men and arrange this program. They met with many obstacles and disappointments, but fortunately were able to call on the reserves and fill the gaps. For obvious reasons it was deemed wise and expedient this year to secure the best men possible, no matter from whence they came. I am sure this decision was right and will redown to the edification of all those in attendance.

The work of the arrangement committee, of which Dr. E. H. Shannon is chairman, deserves much commendation. He divided his committee into five parts and made each member of the arrangement committee chairman of a sub-committee consisting of five men each, as follows: Exhibits, E. H. Shannon, chairman; Entertainment, J. P. Henahan, chairman; Reception, Geo. Bishop, chairman; Information, Guy D. Lovett, chairman; Press and Hotels, H. R. C. Wilson, chairman. By so doing Dr. Shannon enlisted the services and co-operation of twenty-five good, hustling live wires, and I am informed that many good and practical ideas have been evolved and that they intend this to be a perfectly-managed meeting. I cannot pass from this committee without saying a word about the exhibits and exhibitors. Although this has been a year in which doubt and uncertainty has lurked in the minds of almost everyone, although many business houses have found it necessary to curtail expenses, and although most of the dental manufacturers have oversold their output, notwithstanding these conditions we have the largest and best exhibit in the history of the society. This is unquestionably due to the fair, impartial and business-like manner in which Dr. Shannon handled the proposition. He thereby elicited without difficulty the early co-operation of the exhibitors. On behalf of the society I wish to extend to them a cordial welcome and say that we appreciate their efforts on our behalf and suggest that we will always profit most by *mutual co-operation*.

The membership committee, of which Dr. A. F. Linscott is chairman; the supervision of components, Dr. C. W. Mills, chairman; the committee on infraction of the code of ethics, Dr. J. F. Stephan, chairman, and the legislative committee, Dr. Charles Swope, chairman, all have done their work well and deserve special mention. The educational, industrial and oral hygiene committee, of which Dr. E. L. Pettibone is chairman, has done a most efficient and creditable work, as the chairman's report will show. On account of the new and changed conditions which have developed during our present crisis, it has been necessary for this committee to devote a great deal of its time and energy to war work. The ad interim committee through its action, advice and counsel has assisted greatly in the administration of affairs. some of which were of great importance and of vital interest to the society and its members.

I mention these committees especially because they have been active during the year and we have had many things in common. The other committees I am sure will do their work, which comes during the session, just as thoroughly and efficiently.

The complete co-ordination of the work, the co-operation, harmony and good feeling between all the officers, committees and members of the society this year has been a most wonderful and gratifying experience to me, and has been duly appreciated, I assure you. It is by such action that the greatest progress in any profession or science may be developed.

THE RESEARCH WORK

The material interest that Ohio has in the Research Institute led me to believe that you would be interested to know its present status. I therefore requested Dr. Price to furnish a report, which he did, and is as follows:

> "The support of the Institute has been substantially enlarged. Three-fourths of the membership of the National Dental Association has now adopted the one dollar dues plan for the support of the Research Institute and is providing, from this source, an income of $15,000 annually. This is being steadily increased and takes the place of the expiring pledges.
>
> The building and equipment fund is increasing steadily. The second mortgage has been reduced to $4,500. The first mortgage is $27,000. The pledges in hand are about $7,000, making the balance to be provided for the building and equipment about $25,000. The equipment has been increased to $10,430 by purchases and gifts, about

$6,000 of which has been in donations of required apparatus and equipment, largely from dental manufacturers. The net worth of the Institute, as found by the audit of the authorized accountants, June 20th, was $69,317.

A skilled research director is being engaged at this time to give his enitre time to the work of the Institute. He will devote his immediate energies largely to the problems of the army and particularly to the study of trench-mouth.

The following important actions were taken by the National Dental Association at the recent New York meeting:

The House of Delegates adopted, to become a part of the constitution and by-laws, the following:

> 'That state and constituent societies add one dollar to their dues for the support of the Research Institute, and the funds so collected shall be remitted directly to the Research Institute, and that the treasurer of the Research Institute report to the House of Delegates those states and constituent societies complying with this request.'

The joint meeting of the trustees of the National Dental Association, the trustees of the Research Institute and the members of the Research Commission adopted the following policy for the Institute:

> That the researches under grants be continued; that the research work in the headquarters be continued; that a research director be engaged as soon as practicable to devote his entire time to the scientific work in the headquarters, with skilled assistants; that the problems in the Institute be limited to pathological problems.

It is expected that the research director will be selected soon to take charge of the staff and the supervision of the scientific work. This duty has been temporarily carried, until the Institute could afford to engage a research director, by the acting managing director. The available energy of the Institute has been directed during the past year to adding to our exact knowledge regarding the management of pulpless teeth. These researches were reported at the National meeting in New York in October and a summary of the results will be reviewed in the Seminar and Clinics at this meeting.

The profession of Ohio has furnished approximately twenty per cent. of the money for carrying on the researches under grant throughout the United States and in the Institute since the organization of the department, and approximately forty per cent. of the building and equipment fund. It is quite just, therefore, that they should have some of the results of this work presented at this meeting.

A cordial invitation is extended to the members of the society to visit the Institute at any and all times, and particularly during this convention."

PREPAREDNESS LEAGUE OF AMERICAN DENTISTS

About the time war was declared last April, I was delegated by the National committee to organize units of the Preparedness League of American Dentists in Ohio. After due deliberation it was thought best if possible to place the organization of these units under the supervision of the Ohio state society. On April 7th, 1917, the ad interim committee and several representatives from various sections of the state met in Columbus and took such action as above suggested, thereby officially authorizing the appointment of a state organization committee. This committee was given definite instruction and within a few weeks a unit was organized in every component society in the state. By the efficient and rapid work of the committee, Ohio was soon standing well out in front, and was leading all other states by a big margin in point of membership and accomplishments. In fact, her lead was so great that she never has been overhauled, and today we have more members in the league than has any other state, and are still growing. We also have more men in active service and more men in France than has any other state (fifteen in France). Some of our men in France had the honor of going with the First American Overseas Expeditionary Force. They had the privilege and honor of being received at Buckingham Palace by King George and Queen Mary. They now are doing heroic service for the wounded soldiers in France. The president of the National Dental Association and the chairman of the legislative committee of the National Dental Association were from Ohio. One of the five original members of the dental committee of the General Medical Board of the Council of National Defense is from Ohio. The designing, constructing and equipping a motor dental car was left to Ohio. The Research Institute of the National Dental Association, located in Ohio, has been called upon to solve many difficult war problems this year. Plans also have been worked out to render dental service to the selective service men. For these accomplishments in the past year we can be justly proud and feel that Ohio has done her bit. With your permission I will consider this a report of your organization committee on the Preparedness League of American Dentists, and inasmuch as the state is completely organized and the work accomplished for which this committee was appointed, I now ask that the committee be discharged and that a suitable standing resolution be passed that will affiliate the Preparedness League of American Dentists with the state society.

We are to be honored by having with us during this meeting Dr. J. W. Beach, National chairman, and founder of the Preparedness League of American Dentists. He has called a meeting of his advisory committee here and we will be further honored by having with us a number of distinguished men who are members of that committee.

THE CHILLICOTHE CANTONMENT

On Sunday, November 4th, 1917, Dr. Pettibone and myself had the privilege and pleasure of visiting Camp Sherman. It is a wonderful city, sprung up as if by magic out of plain, crude farm land, with many wide boulevards running parallel and being intersected by many other boulevards. The cantonment is perfectly planned and laid out and is equipped and supplied with all modern conveniences. The government has expended more than ten million dollars to make this a proper place to house our boys. Nothing has been left undone and no expense spared to give them the best of everything. We all agree with the government in this respect; there is not nor could there be a single dissenting vote.

The camp is about two and one-half miles long and two miles wide and comprises some 3,000 acres of ground and 2,500 buildings, all modern and sanitary. Accommodation has been made for about forty thousand men. If you have not visited Camp Sherman there is an agreeable surprise in store for you when you do. Dr. Charlie Mills met us at the train with his taxi (Charlie calls his automobile a "taxi" since the cantonment arrived and he uses it as such, except that he pays the bills; so when you go to Chillicothe just wire or write Charlie the time of your arrival and he will meet you). He was accompanied by Lieut. B. H. Sherrard, the dental officer in charge of dental activities at the camp, who extended to us a very cordial welcome, conducted us about the camp and gave us full information regarding the dental situation and the work that has been done. At that time there were eleven portable and one permanent outfits in the camp, including a full equipment of instruments and materials for each outfit. There were forty-eight dental officers; the men were working in shifts and had been able to accomplish a great deal. All emergency cases were promptly cared for and all other work was progressing as well as could be expected. During October 1304 patients were treated, involving 2245 sittings and over 4000 operations of various kinds. I understand thirty complete new permanent outfits have been received and will be placed as soon as the buildings are ready. Leiut. Sherrard informed us that there would be three dental units located in various parts of the camp, and a dental section in the base hospital. Each unit will be equipped for ten operators, prosthetic laboratory and assistants, with one dental officer in charge, making eleven dentists with each unit. The base hospital will be equipped for four operators, prosthetic laboratory and assistants. In addition to this there will be one regimental dental surgeon at each regimental infirmary, a regiment consisting of 3,200 men. The work is confined principally to plastics and extractions, but by a recent order from the Surgeon General, the dentist may repair crowns and bridges for the men who have been accepted with them, and they may also make artificial plates for men whose health, in their judgment, demands it.

Dr. Pettibone has been co-operating with Lieut. Sherrard in establishing a systematic course of lectures and instructions in oral hygiene. The company commander requires oral hygiene at present, so the propaganda should be easily disseminated.

FREE DENTAL ACTIVITY FOR THE NEW NATIONAL ARMY

You are all familiar with the large percentage of civilians who are suffering from dental defects or lesions, and you are also familiar with the sequellæ of same; therefore it needs no argument to convince you that a large percentage of the selective service men need dental services. The paramount question, then, is whether or not the government has provided a sufficient number of dentists and equipment to take care of these men after they reach the cantonments and before they are removed from same. Lieut. Sherrard informed me that several thousand men had been examined at Camp Sherman. The results were about as follows: Of the foreign extraction examined, it was found that the teeth and mouth were either very good or very bad; there did not seem to be any middle ground—the good and bad checked up on about a fifty-fifty basis. Of the Americans examined it was found that fifty per cent. of them were in good condition and probably would not need dental service for a considerable time; thirty per cent. were in fair condition and would require service within a reasonable time, and the other twenty per cent. were in need of immediate service.

There are forty thousand men in this cantonment. Considering that each man be allowed only three twenty-minute appointments, it would make 120,000 appointments and 40,000 hours. It is understood that the men will remain at the camp on an average of five months, or 130 working days. An analysis will show about the following results: 120,000 appointments in 130 days equals 923 each day; 923 appointments per day for 30 dentists equals 30 each day; 30 appointments per day of 20 minutes each equals 10 hours a day for each dentist, making a total of 30 patients and 10 hours' work a day for each dentist, and that takes care of but three appointments for each patient. You can quickly see by these calculations that it is utterly impossible for the dentists in the cantonments to do all the work that is necessary for the welfare and efficiency of the men. In addition to the men, the dentists are required to render dental service to the families of the officers when requested to do so.

One of the objects of the Preparedness League of American Dentists was to render free dental service to the volunteer army, and a great deal of work was done all over the country previous to the draft. In Ohio, as you know, the local units had charge of that work. When the draft law went into effect, Gov. Cox requested, through Dr. H. C. Brown, of Columbus, that some method or plan for giving the selective service men dental attention be formulated and presented to him. This was done and through this plan, supplemented by the plan worked out and made effective by Dr. C. F. Ash and Lieut. Heckard, of New York, and Major Logan, of the Surgeon General's office (a detailed report of which is published in the October number of the *Journal* of the National Dental Association), we expect to take care of the selective service men in Ohio for the next call. In order to do this with any degree of success it will require the co-operation of every dentist in this society, and I urge that every man come forward unhesitatingly and do his bit. Detailed instructions and information will be sent to each unit, so you will know exactly what to do. To make the men who go to France dentally fit is one of the important problems facing the dental profession. The only way that this can possibly be done under present conditions is for the profession at large to render material assistance to the army dental corps. If the mouths of the men are put in a healthy condition before they leave this country the task of the regimental dentist will be lessened, and even under the present law which allows one dentist to each one thousand to enlisted strength, they will be able to keep the mouths in a fairly satisfactory condition.

STATUS OF DENTAL STUDENTS

Immediately after the selective conscription bill was made a law the question arose as to whether medical and dental students would be permitted to continue their studies and be exempt from service until after graduation. The prevailing opinion was that these students would not be molested in their work, as it was thought the mistakes made by England and France would be taken as a warning and that medical or dental students would not be accepted for line service. However, it was not long until the war department announced that there would be no exemptions execpt as provided by law, and this did not seem to include either medical or dental students. The medical profession then became very active on behalf of their students and made the claim immediately that the enlisted reserve corps law which was approved June 3, 1916, under act of Congress, and which was a part of the general scheme of the national defense laws, could be utilized in such a contingency as this. After much argument and considerable delay, Provost Marshal Crowder issued an order, dated August 29th, 1917, permitting second, third and fourth-year medical students who had been drafted to enlist in the enlisted reserve corps. Inasmuch as the medical department of the army is made up of medical, dental and veterinary divisions, it was supposed that Gen. Crowder's order included dental students. However, when dental students asked this privilege of their local boards, they were informed that they were not included in the order. The committee of Deans of the dental colleges of the United States which had been appointed several weeks previous for the purpose of working out the destiny of the dental students, called another meeting in Washington and for the second time placed the whole matter before the Secretary of War. The committee was informed by Mr. Baker that the dental students were not included in the order and the reasons for not doing so were very clear in his mind. However, he said that he was willing that the question should be reconsidered and asked the committee to file all data pertaining to the matter with the Surgeon General, with whom he would confer. The committee promptly followed this suggestion. Without having any definite information it would seem that the conference between the Secretary of War and the Surgeon General must have been favorable to us, because when the following amendment, namely: "All regulations concerning the enlistment of medical students in the enlisted reserve corps and their continuance in their college course while subject to call to active service, shall apply similarly to dental students," was offered to the Lodge Amendment to H. R. 4897, there was no objection, and it passed the Senate on October 5th, 1917, without difficulty, was accepted by the House October 6th, signed by the President the same day and was thereby made a law.

This action may be considered as very important to the dental profession as it seems to make it an integral part of the medical department of the army, thereby giving definite recognition. Get this point: When a medical or dental student enlists in the enlisted reserve corps, he is not exempt from military service; he is subject to call to active duty at any time, but he may be allowed by order of the war department to finish his course, after which he can be called into service in any capacity the government desires.

The reasons for continuing the courses in the dental colleges are obvious, as you know, and it is not necessary for me to discuss them; but I wish to give you a bit of information which may surprise you. The number of graduates from all the dental colleges in the United States for 1917 was 2,975; of this number eighty-five per cent., or 2,428, took State Board examinations, and of these sixteen per cent., or 388, failed, leaving a total of 2,040 who qualified to practice. This is only five per cent. of the number of practitioners in the United States, which is about 40,000. Statistics show there are at least five per cent. of the dentists leaving the profession each year, so the supply is barely keeping up the number, and is not in any sense proportionate to the increased population and to the increased demands for dental service.

In confirmation of the above statement, I might say that in discussing the question with a dental manufacturer of fifteen years' experience, he informed me that in 1902 there were about 38,500 dentists in the United States, and in 1917 there were about 43,000, making an increase of about 4500 in fifteen years, or an average increase in the entire United States of 300 per year.

DENTAL RESERVE CORPS

The dental profession had been fighting for recognition in the army and navy for many years, which first culminated in the passage by Congress of the National Defense Act, June 3, 1916, the regulations of which provided for the establishment of a dental section, a branch of the Officers' Reserve Corps. The dental officers were given the rank of First Lieutenant. They were to be appointed and commissioned by the President, after having complied with certain rules and regulations prescribed by him. After the declaration of war the government, through the Surgeon General's office, asked for volunteers to the Dental Reserve Corps. The dental organizations throughout the country, but more especially the Preparedness League of American Dentists, in co-operation with Major Logan of the Surgeon General's office, went to work on the proposition. While this law was not all to be desired, nor was it satisfactory to the men in many respects, nevertheless, by hard and consistent work on the part of the organizations, but principally from patriotic motives of the men, results began to show and the dentists from all parts of the country were making application for admission to the reserve corps. Applications were received and commissions recommended until about the middle of September, when between 3,500 and 4,000 had been received, when the issuance of commissions was suspended.

On September 20th, 1917, the following notice was issued:

FORM T-1. LL WAR DEPARTMENT

OFFICE OF THE SURGEON GENERAL, WASHINGTON

September 20, 1917.

From—The Surgeon General of the Army.

To—........................

Subject—Application for examination for commission in the Dental Reserve Corps, U. S. Army.

1. The Surgeon General directs me to advise that examinations of applicants to the Dental Reserve Corps have been discontinued for the present.

2. There is now a sufficient number of dentists enrolled in the Dental Reserve Corps to care for a larger army than will be called to the colors in the immediate future.

3. There are two exceptions made to the above mentioned discontinuance of examination:

First, Since this department will have need of certain dental specialists in various locations in this country and abroad, application will be considered of such men as are especially well qualified in such branches as the needs of the army may demand. The dental specialists needed at this time are to be found among those who have had experience in the management of fractures of the jaws, and in minor or major oral surgery. Applications for appointment in the Dental Reserve Corps will, therefore, be considered of men qualifying in the work above outlined.

Second, When a dentist is drafted and has been physically accepted by those in charge of the camp where the dentist has been sent as a private, he may then make application for appointment in the Dental Reserve Corps through the proper channels to the dental surgeon there in charge, who will promptly have completed papers sent to this office for final action, when an additional number of dental officers are required.

4. Applications already received will be placed on file in this office, and the applicants informed when the examinations to the Dental Reserve Corps are resumed.

5. The department appreciated the patriotic motive which prompted so many to make application for commission in the Dental Reserve Corps, and regrets its inability to authorize further examination at this time.

(*Signed*) W. H. G. LOGAN,
Major, M. R. C., U. S. A.

It is a notable fact and one of which we can feel proud that all these applications were made under the law of June, 1916, and without any assurance to the applicants that there would be any other conditions created. The men who understood the situation best, knew that the practical application of this law would not be satisfactory, the variance being too great between the dental and other reserve corps. These men went to work in a systematic and determined manner. A satisfactory bill was then formulated and placed in friendly hands at Washington with the understanding that it would be brought before Congress at an opportune time. The crystallization of the effort came when the Lodge amendment to H. R. 4897 was made a part of the Dent bill. This amendment placed the Dental Army Corps on the same basis as that of the Medical Army Corps. The dental profession was then asked to make a fight for this recognition. Dr. H. C. Brown, of Columbus, Ohio, chairman of the legislative committee of the National Dental Association, led the offensive. He was ably assisted by Major Logan and Dr. Bryant, of Washington, and on October 6, 1917, the bill was signed by the President of the United States and made a law. For your information the following is an exact copy of the law as passed:

"(PUBLIC—NO. 86—65TH CONGRESS.)
"(H. R. 4897).

"*An Act To provide for the promotion of first lieutenants in the Regular Army and National Guard to the grade of Captain, and respecting the Dental Corps of the Army and medical and dental students and for other purposes.*

"*Be it enacted* by the Senate and House of Representatives of the United States of America in Congress assembled, That during the existing emergency first lieutenants in the Medical Corps of the Regular Army and of the National Guard shall be eligible to promotion as captain upon such examination as may be prescribed by the Secretary of War.

"Hereafter the Dental Corps of the Army shall consist of commissioned officers of the same grade and proportionally distributed among such grades as are now or may be hereafter provided by law for the Medical Corps, who shall have the rank, pay, *promotion* and allowances of officers of corresponding grades in the Medical Corps, including the right to retirement as in the case of other officers, and there shall be one dental officer for every thousand of the total strength of the Regular Army authorized from time to time by law; Provided further, That dental examining boards and review boards shall consist of one officer of the Medical Corps, and two officers of the Dental Corps; Provided further, That immediately following the approval of this Act all dental surgeons then in active service shall be recommissioned in the Dental Corps in the grades herein authorized in the order of their seniority and without loss *of pay or allowances* or of relative rank in the Army; And provided further, That no dental surgeon shall be recommissioned who has not been confirmed by the Senate.

"All regulations concerning the enlistment of medical students in the Enlisted Reserve Corps and their continuance in their college course while subject to call to active service, shall apply similarly to dental students.

"*Approved, October 6, 1917.*"

The dental profession is to be congratulated upon receiving such recognition. It marks one of the grandest achievements in the history of the profession. Too much credit cannot be given to those men who worked so efficiently, energetically and faithfully in the interest of the profession. This was done in many instances at a big financial sacrifice and physical drain. It is generally conceded that the most influence in getting favorable action on this legislation came from Ohio. The work done by the profession was directed through the office of Dr. H. C. Brown, who handled the proposition scientifically and efficiently; the results confirm the effectiveness of the work. The Association of Military Dental Surgeons of the United States expressed their appreciation in a material way by donating to Dr. Brown a beautiful watch, with appropriate engravure, and I ask that suitable resolutions be passed by this society and presented to Dr. Brown.

The government officials to whom we are most indebted for this law are President Wilson, Secretary of War Baker, Senators Pomerene, Lodge and Overman and Congressman Dent. I respectfully request that suitable resolutions be passed and transmitted to these gentlemen.

The men who have accepted commissions in the Dental Reserve Corps and who have been assigned to active duty have, in many instances, done so at a big sacrifice. Many of them have given up lucrative practices and have left their families and other dependents behind. It seems to me just and right that some plan should be evolved whereby a certain and equitable percentage of the fee charged their patients who apply to various men for services be turned over to him or his family. The medical profession here are remitting forty per cent. of the fee in such cases. I would advise that this matter be taken up by all the component societies and immediate action taken.

Some action should also be taken in appreciation of the patriotic spirit shown by these men who have enlisted in the service of their country, and I recommend that a permanent honor roll be established on which each man's name shall be placed, and further, that resolutions be passed and sent each man expressing to them the appreciation, loyalty and good will of this society.

I believe also that the dues for every man on active service should be remitted, and that that responsibility should rest with the component society of which he is a member. I therefore recommend that resolutions be passed and sent to the officers of each component requesting that such action be taken. (*The Committee of Dentistry.*)

The Council of National Defense was authorized by Congress some time after the declaration of war, and comprises all activities of the Nation which are concerned in or are of vital interest to the conduct of the war. Dr. Franklin Martin, of Chicago, was appointed on the Council and is chairman of the Medical Board. In selecting his committee he gave the dental profession recognition by appointing Dr. E. C. Kirk, who was requested to name a dental committee of which he was to be chairman. He first named five men, four of whom were to be chairmen of the following sub-committees: Hospitals, Education, Research and Organization. Since then the committee has been enlarged and the work extended and Dr. Kirk has been succeeded by Major Logan as chairman of the committee.

The committee is now known as the Committee of Dentistry of the General Medical Board of the Council of National Defense, and has for its objects the consideration and consolidation of all branches of dental activities so far as affected by the present war, and to act as a connecting link between the government and the profession. The advantages of having such a committee as this are obvious. Whenever the members of the profession arrive at the conclusion that every dental proposition concerning this war should go through the same channels, be analyzed and certified to at a central department, we will have accomplished a great deal. It is only in this manner that waste of money, energy and effort can be avoided, and most of all, results obtained.

The soliciting of subscriptions for money, work, and other things should not be countenanced and should not be contributed to without the proposition first having been approved by the proper committee. The spasmodic solicitation and raising of funds for things which may be of no use to the government will react to our disadvantage and detriment. I think these precautions should be taken in order that our resources may be conserved. I believe before this war is over and our obligations removed that we will all have to give in time and money to almost our last dollar, and we should be ready and willing to give and give freely when the proper call is made. I have confidence that every dentist is patriotic enough to answer any summons to which he may be called when he has the assurance of its being right.

This whole sad and terrible affair has passed the sentimental stage and now has resolved itself into a hard and fast business proposition. The sooner we realize this condition the better it will be for us.

RECOMMENDATIONS

In the progress of dentistry and the consequent natural growth of this society in point of membership and advanced business and professional policies, it becomes necessary from time to time to change and enlarge the constitution and by-laws that a more comprehensive policy may be pursued. Without any further discussion at this time the following changes which I shall suggest have been given due consideration and thought and are recommended in the belief that they will aid greatly in the efficient management of the society.

The first recommendation is that the offiice of President-Elect be created and that Article 3 of the constitution be changed to read as follows:

ARTICLE 3

OFFICERS

The officers shall be a President, President-Elect, First Vice-President, Second Vice-President, Secretary and Treasurer.

The second recommendation is that the second paragraph of Article 4, Section II, be changed to read:

Each Component Society transmitting dues for fifty members shall be entitled to elect an additional member to the Board of Directors and shall be entitled to one other member for each additional fifty members.

The third recommendation:

That the society elect an Executive Secretary whose duty it shall be to conduct all the business affairs of the society under the supervision of the Officers and Board of Directors.

This recommendation follows the suggestion made by President T. I. Way last year and is in accordance and harmony with the conclusion of the committee appointed to report on same.

The fourth recommendation:

That the Ad Interim Committee be made a standing committee.

Fifth recommendation:

That there be created a Committee on Military Dentistry.

CONCLUSION

In conclusion, may I ask how many of you here today realize the seriousness and significance of this war? How many of you realize the colossal task that we have undertaken, and the stupendous preparation that is necessary? Congress already has voted appropriations of more than twenty billions of dollars. It is estimated that the war will cost the United States alone one hundred billions of dollars, and that the cost to combatants has now exceeded that amount; estimated on the basis of two thousand years, it has already cost over a dollar per second since the birth of Christ. These figures are almost incomprehensible, and yet they sink into insignificance in value when compared to the tremendous and appaling sacrifice of human life. The loss to the British army alone has been more than thirty thousand men a month since the beginning of hostilities, and the loss to the French, Italians and Germans has been proportionately as great.

There are at present over thirty-eight million men in uniform. It would require all the dentists in America to care for this vast army at the present ratio of one to one thousand.

There were in England at the beginning of the war about twenty munition plants employing some twenty thousand men. Today there are almost five thousand plants employing over four million *women*. Germany has doubled her production the last year. Big things are expected of American business. There will have to be a mighty production of munitions, supplies, motor cars, air craft, ships, locomotives and rolling stock. The excellent achievements of American business and industry in the past must be far exceeded. They must organize and produce to the extreme limit, and must do so without the help of thousands upon thousands of the best men who have been called to the colors. The efficiency with which this is done and the ability to accomplish and endure will be one of the deciding factors in winning the war.

We are at war with the world's most powerful, most relentless and most despised enemy. An enemy who has prepared for war for many decades, and one who has put into effect an unbelievable war efficiency, whether the work has been the honest manufacture of industrial products and equipment at home, the dishonest and traitorous undermining intrigue of nations, or the relentless torture of an innocent and helpless people, the same efficiency has been displayed. Up to the present time Germany has been victorious; she has accomplished most of her pre-war aims and desires. She has taken a large amount of territory in Central Europe; has conquered more than forty millions of people and now completely dominates over 180,000,000; has practically established a line of communication between Berlin and Bagdad; has wrecked the Russian government; has claimed and seized the resources of all the conquered territories; her armies have invaded every country they have been sent against and she has made her unrestricted and murderous submarine warfare a success. Her military establishment and power are yet unbroken and the terror of Prussianism and militarism still reign. It is estimated that her army consists of nine million men, all well trained and thoroughly equipped. This gives you some idea of the present situation and the enemy we must defeat.

That the United States was to be drawn into this great conflict was inevitable. Every possible effort was made by our government to keep us out of war. Every diplomatic resource was exhausted, but to no avail. These words of President Wilson may still be ringing in your ears: "The time has come when we must *conquer* or *submit;* for us there is but *one* choice and we have made it."

Now it is up to every red-blooded American to stand by his government and fight; and fight with everything at his command and with his life if necessary. To win this war will require the complete mobilization and use of every resource, natural, industrial, financial and human, of all the allied countries. It undoubtedly will be a long, dogged and terrific struggle. No government official or war expert will venture the prediction that it will be less than three to five years' duration, and probably more. To win will mean a great sacrifice in money and men. Luxuries must go and necessities supplant them. "Conservation, Economy, Courage, Determination and Patience" must be our slogan.

The government must be supported to the last ditch; our patriotism must not be questioned in the darkest hours, and we must fight until an unqualified and uncompromising peace is declared.

Finally, when our armies are engaged in the deadly conflict of battle and the eyes of all the world are turned upon them, and all America is looking forward to the crowning achievement of victory, which will surely come, let the patriotism and fighting spirit of all Americans stand forth in all its glory, that the attribute of bravery and determination may be given them as it has been given to our Allies.

Major Geo. W. Crile, recently returned from the front, while discussing the war said: "No matter what else may happen, I can say positively that no British soldier will ever leave France alive, in defeat."

Lieut. Picard, of the French army, who was in the historic retreat of Gen. Joffre, and who fought in the battle of the Marne, said: "When the French army was ordered to halt at the Marne, it was understood by every man that not another inch of French territory was to be surrendered even though it should cost the last drop of French blood, and the line *held fast.*"

A few days ago when the Italians were so sorely and hard pressed on the northern portion of the Piave line, Gen. Geribaldi, in answer to the question as to whether his line could hold or not, replied: "Yes, we can hold, but if by superior generalship or greater numerical strength the enemy advances, it will be over our dead bodies, as the morale of the men is perfect."

The last message from Gen. Pershing to the American people reads: "Tell the American people there is no ground for the heresy that Germany cannot be beaten; Germany can be beaten, Germany must be beaten and Germany *will be beaten!*"

458 Rose Building.

IN MEMORIAM

J. L. Newborn

"Let me not forget the glamour of the world,
But walk calmly in my path.
Give me a few friends who will love me
For what I am, and keep ever burning before
My vagrant steps the kindly light of hope.
And though age and infirmity overtake me,
And I come not in sight of the castles of my dreams,
Teach me still to be thankful
For life, and for time's golden moments
That are fond and sweet, and may the evening
Twilight find me gentle still."

DR. J. L. MEWBORN, one of the most prominent dentists in America, and a Civil War veteran, died at his home in Memphis, Tenn., Saturday, December 15, 1917, at the age of 79 years.

Dr. Mewborn was one of the organizers of the Southern Dental Association, which afterward was merged with the National Association. He also was one of the men who formed the state and local dental associations and was chosen to the presidency of each of the societies.

He played an important part in securing legislation in Tennessee governing the practice of dentistry, which has placed the state second to no other commonwealth regarding the high standards which must be attained by all members of the profession.

Dr. Mewborn was born near Huntsville, Ala., in 1838, and was a student at LaGrande College when war broke out. He was made a second lieutenant in the Thirteenth Tennessee Infantry and was present at the first battle of Manassas. In the last year of the war the young soldier was captured and it was while a prisoner on Johnson's Island that he began the study of dentistry.

When peace again reigned he attended the New York College of Dentistry and graduated with first honors. He married Miss Mary Matthews, at Macon, Tenn., and shortly after removed to Memphis, where he was engaged in the practice of dentistry for fifty-two years.

Surviving him are four sons and four daughters: Dr. A. D. Mewborn, of New York City; J. L. Mewborn, Jr., Lieut. Garnett Mewborn, of Camp Wheeler, and C. A. Mewborn, of New York City; Mrs. A. C. Featherstun, of Senatobia, Miss.; Mrs. W. B. Fisk, of Montgomery, Ala.; Mrs. W. H. White, of Olive Branch, Miss., and Miss Edna Mewborn, of Memphis.

The honorary pallbearers were: Drs. D. M. Cattell, A. Barnett, E. F. Simpson, J. A. Gardner, C. E. Hines, W. J. Hunt, Porter Johnson, J. L. Manire, W. W. Oursler, E. W. Taylor, J. D. Towner, N. W. Sherman, R. E. Baldwin and E. D. Martin. The following were named as active pallbearers: Drs. C. J. Washington, Geo. E. West, W. M. Slack, W. E. Lundy, J. W. Peete, J. E. Gachet, C. H. Taylor and W. D. Gaither.

Whereas, By the death of our honored and esteemed colleague, leader and friend, Dr. Joseph Lemuel Mewborn, the Memphis Dental Society feels that it has been sorely bereaved in a personal as well as a professional manner. Personally, because of his courteous and cheerful conduct in our every-day social relations. His attitude toward us ever has been of the most kind and considerate nature and will remain with us as a precious memory. Professionally, we shall miss his wise and experienced counsel and his deep interest in and devotion to our work. He was every ready to make needed sacrifice of time and talent for his beloved profession, to which he gave so many years of valuable service.

Perhaps the feature of his character which was most admirable was the impeccable soundness of his moral fiber. Indecision and indirection were foreign to his nature, and to all the activities of his long, honorable and useful career he brought sterling integrity and absolute loyalty to truth. Uniformly urbane and courteous in social intercourse, and in the highest sense a gentleman; when aroused he had at command large potencies of incisive speech with which to enforce a lesson, expose a fallacy or condemn a wrong. A veteran in dentistry and a pioneer in all those progressive advances which finally culminated in its organization and recognition as a distinct professional body.

Whereas, In the passing away of our beloved friend we have the assurance that God, our all-wise Heavenly Father, has taken him unto His bosom. Therefore, be it

Resolved, That the Memphis Dental Society extends its sincere sympathy to Mrs. Mewborn, the sons and daughters in their bereavement, which is the sorrow of each and every member of the society and the profession at large. We wish to express our high regard for the worth and character of this loving and lovable man.

At the banquet of the Golden Jubilee of the Tennessee State Association, 1917, Dr. Mewborn closed his memorable and beautiful response to the toast, "Reminiscences of Long Ago," with the following address and touching bit of verse, which seem to have been anticipatory and prophetic:

REMINISCENCES OF LONG AGO

BY J. L. MEWBORN, D.D.S., MEMPHIS, TENN.

In introducing the speaker, the toastmaster, Dr. David M. Cattell, said:

Ladies and Gentlemen: I am undertaking now to introduce to you Grandpa Mewborn, the grand old man of this occasion, the grandest old man of Tennessee, the most lovable old man of the profession in the south. We all love Grandpa Mewborn. He has spent the most of his life for the benefit of mankind. He learned the lesson of working for others early in life. He has improved upon it every year and has done wonders for his fellow men. He is so modest, so dislikes to put himself forward, that he often misses occupying the seat that should have been filled by him. He has been called upon to occupy the high places in the profession many times. He was one of the organizers of this association. Indeed, it is thought that his was the first suggestion of such an organization. His spirit has been the guiding star and his presence the connecting link holding together factions that might have proved disastrous, but with his fatherly kindness, his brotherly counsel, these varying factions have been held together.

Doctor Mewborn has a story to tell. He will not tell it all owing to his great modesty, but we will be interested in what account of his life he gives us. It is almost his *swan song* that we will listen to tonight. We are so glad that he is with us that we cannot express ourselves fully, but we will leave our revered father to tell the story in his own way: Dr. Joseph Lemert Mewborn.

AT A MEETING of the local dentists of Memphis, June 21, 1867, a circular letter was issued calling on the dentists throughout the state to meet in Nashville on July 26, 1867, for the purpose of organizing a state dental association. Quite a number answered this call. The meeting was held in Dr. Wm. H. Morgan's office; a constitution and by-laws were adopted and officers elected.

I was one of the early sponsors for the good behavior of this kid on that occasion. Memphis then had 10 dentists and 25,000 inhabitants; now it has about 80 dentists and about 218,000 population. From 1867 to 1917 completes fifty years. "And the Lord said unto Moses, 'And ye shall hallow the fiftieth year and it shall be a jubilee unto you.'"

My friends, you have had several addresses of welcome to the city of Memphis and to this, our golden anniversary, but as the only charter member present, it has fallen to my lot to greet you again at this banquet, the principal social feature in the celebration of our jubilee.

Our greeting to you around this festive board is no cold formality, no flamboyant cavalcade, tournamenting on the pleasant plains of thought, like the beautiful birds of the Persian fable, engendered by the river flowing through Paradise, which warble for a moment then vanish forever. In other days on occasions like this we were sure of "a feast of reason and flow of soul," punctuated or accentuated by an occasional quaff from the flowing bowl, but in these inhospitable days we could find no power in a "bone-dry" town that could turn hydrant water into wine.

While we congratulate ourselves on being honored by you, we again remind you that this is no ordinary occasion, nor this a mean selection for your convocation. We welcome you to a city whose past has been baptized in the waters of affliction, whose present is resplendent with all the elements of progress, and whose future prosperity and growth are far beyond the limitations of human ken.

In the completion of our second great steel viaduct, whose giant limbs, like the "Colossus of Rhodes," span the mighty Mississippi, quickening transit and doubling the capacity of our railroads which, as our president said, "are gathering to her bosom tribute from the sons of toil who are peacefully at work keeping the industrial processes of the world quick and vital, and gleaning from the commerce of the world factors for the sustenance and maintenance of our women and children."

Her rugged slopes and busy borders are bathed and dimpled by the ceaseless current of our majestic river, whose generous and spacious bosom can float a fleet of armed vessels in time of war; and together with all her tributaries will some day be teeming with light-draft motor barges and old-time flat boats, with a system of trunk-line railroads radiating to every point of the compass, all vieing with each other in gathering to her marts of trade and for distribution abroad, our cotton, our wheat, our corn, lumber and all food products from the lakes to the gulf.

With all these elements under leash she has gathered strength and risen Phœnix-like from the bitter dregs and poisoned ashes of the epidemics of '78 and '79.

Webster defines a dentist as "one who makes it his business to clean, extract and repair natural teeth and to insert artificial ones." This definition, while comprehensive as a mere skeleton, does not suggest that fullness of growth, that diversity of skill and that dignity of effort which constitutes the insignia of royalty, whereby our profession is recognized as co-equal with any of the advanced stages of modern civilization.

But when we remember that Trumbull said that, "that great lexicographer breakfasted on institutes, dined on dissertations and went to bed supperless," we easily can account for the limited range of this definition and imagine that Webster himself must have hybernated in some toothless region of despair. To define a dentist of the present day we would denominate him with a wholesome comprehensiveness as one who pursued as his life work, after a four-years' course in a dental college, the most scientific research and by the most enlightened methods the practice of dentistry, a profession like its co-ordinate of medicine, baptized with that spirit of exalted usefulness and beneficent exertion which has given it an impetus and sustained it in its onward progress to its present standard of excellence.

Dr. A. W. Thornton, dean of the McGill University, Montreal, Canada, in the discussion of his paper on "Crown and Bridge Work," read before the Second District Dental Society of the state of New York, in December, 1915, said: "Many of the poor people who are traded upon by men practicing such dentistry, could have better satisfaction for the same or less amount of money by having a removable appliance of some kind;" and, speaking from the standpoint of a teacher, said: "I know of no professional man or man of any calling who must know as much in order to be successful in his calling as the dentist; and yet it is absolutely impossible in the time at our disposal in college to turn out men capable of doing the kind of work that is properly made and properly adjusted, or even to know when it is not properly adjusted nor how to remedy the trouble."

Is this a lamentable fact? Is this derelict fed on the blasted windfalls from the tree of Sodom? Does he hope to make the spoils from commercializing his profession, like the flowing locks of Sampson, the secret of his strength, the secret of his success? If so, let him not sleep with his head in the lap of his Delila.

During the period since the organization of our state association, on account of the world's kaleidoscopic changes in the events which have crowded each other in more rapid succession than ever before in the world's history, great advancement has been made in civilization and in all its manifestations, including religion, medicine, surgery and the various branches of science, but in none more remarkably brilliant than that of dentistry.

When we look around over the sisterhood of sciences, all keeping step with the spirit of the age and the music of the spheres, and all in the full blaze of their brilliant achievements, then hark back to the ages and generations past, we will see that we occupy an altitude to which none of our ancestors ever have attained, and realize that all the achievements and blessings of 6,000 years have been crowded into one century and we stand on the meridian of that favored cycle, and still her escutcheon grows brighter each succeeding year as new and unknown materials, and principles, and methods, and appliances, and implements are added to her armamentarium.

Ours is a profession which has contributed and is still contributing many cherished and illustrious names to the annals of progress, which are recorded in God's top row and emblazoned in letters of gold, high upon fame's immortal roll of honor.

In 1888 I celebrated the golden anniversary of my natal day; in August, 1915, I celebrated my 50th anniversary as a dentist; in 1916 I celebrated our Golden-wedding day, and on this occasion we are celebrating the Golden anniversary of our state dental association. I am not very partial to these Golden anniversaries. They come only once in a lifetime, and then, in a retrospective mood, we realize that life, like the natural day, has its morning, its noon and evening, its joys, its triumphs, its disappointments and the saddest reflection of all is that the aged cannot enjoy the exhilarating pleasures of youth. I am reminded of my boyhood days, my school days, and of that dark and bloody period from May, 1861, to June, 1865, during which I drilled and marched and fought with the "Army of Tennessee" from the Ohio River to the Gulf of Mexico, and I state it modestly when I say that in all my battles I went as far and stayed as long as any other man.

I shudder when I think of my detached service, operating within the enemy's lines; of being betrayed, ambushed and captured; of one miserable night spent in Moscow guarded by negroes; three weeks in the Irving block in Memphis; under heavy guard to Johnson's Island; how I walked three miles on the thin ice of Lake Erie between Sandusky, Ohio and the prison, arriving as "fresh fish" on the 23rd of December.

In this enforced companionship, with 3000 Confederate officers, with no hope of release until the close of the war, I saw the need of an engraver in the prison, seized the opportunity, made my own engravings and after a few weeks' practice became the prison engraver, making from $2.50 to $5.00 a day. As a side issue I secured the necessary text-books and studied Harris' "Principles and Practice of Dental Surgery," Taft's "Operative Dentistry," Richardson's "Mechanical Dentistry," Gray's "Anatomy," Dalton's "Physiology" and Fown's "Chemistry," the then full course of dentistry as preparedness for future action. When the end came, broken in fortune and feeble in health, with borrowed money I bought a pupilage under a practicing dentist who took my money but taught me nothing. Then with more borrowed money for equipment and for office furnishing, also a horse and buggy (for you know I did a traveling practice for five years), then borrowed more money and still more money to put me through college in New York, where I graduated. My first patient was a fellow student for whom I filled six approximal cavities in the upper incisors in one afternoon of my first week as a dental student. I never had seen a cavity prepared nor a tooth filled. I used only long-handled excavators and burs, safe-sided separating files, right and left gimlet pluggers, foot burnisher, hand pressure and Abby's soft gold foil.

I had the good fortune to examine those fillings forty years afterward, and notwithstanding the lower thirds of these teeth and fillings were worn, or whetted away, from excessive use of tobacco, the remaining two-thirds were in perfect condition; no crumbling, no leak nor shadow about any margin. A few days ago I saw a soft gold filling in the grinding surface of an upper molar, made also while a student fifty-two years ago. Then we used Abby's soft gold foil, Lawrence's amalgam, tin foil, agate or oxy-chlorid of zinc cement and Hill's stopping. Then we had no synthetic cement, no porcelain nor metal inlays, no cohesive gold, no rubber dam, no hand nor machine mallet, no dental engine, no electric light, heat, power nor radiograph pictures of the interior structure of the organs and tissue of the body. Then we had no bridge work, no nerve blocking, no conductive anesthesia, no hydraulic chair nor fountain cuspidor, no bugs, no sterilizer, no apical abscess nor foci of infection, but two or three dental journals and only a few of the states had dental laws. In case of acute abscess, poultice with hot raisins and lance the gum boil. Afterwards open up the root canals, treat with "4-2-1" until well; then fill with oxy-chlorid of zinc on fiber of cotton rolled into rope and cut into pellets. In a blind or chronic abscess, make an artificial fistula to the apex of the root, unless one already existed, open the root canal, cleanse and pass 4-2-1 through the fistula, then fill the pocket or necrotic area at the end of the root, no matter how large it might be, with a "gutta-percha graft," made by dissolving base-plate gutta percha in chloroform to creamy consistency, injected through the root canal from a syringe under high pressure till it appears from the fistula on the gum; then complete root and crown fillings.

At that time dentistry had already passed through the incubation period of 150 years, under the fostering care of such pioneers as Paul Revere, Gardet, Greenwood, Hudson, Hayden, LeMaire, Flag, Harris Horace Wells, down through the clinical investigators like Atkinson, Bonwill, Kingsley, Brophy, Evans, Miller, C. N. Johnson and Black, on down to those great exponents of *professional ethics* and *safe* and *sane* dental educators, the late Wm. H. Morgan, J. Y. Crawford and our own beloved D. M. Cattell.

Mr. Toastmaster:

Here is a toast I want to drink
To the fellow I'll never know,
To the fellow who will take my place
When it's time for me to go.

I've wondered what kind of a chap he'll be,
I've wished I could take his hand,
Just to whisper, "Wish you well, old man,"
In a way he'd understand.

I'd like to give him the cheering word
That I have longed to hear;
I'd like to give him the warm hand-clasp
When never a friend seems near.

I've learned my task by sheer hard work,
And I wish I could pass it on
To the fellow who will take my place
Some day, when I am gone.

Will he see all the mistakes that I have made,
And note all the battles lost?
Can he know the sleepless nights they've given,
Or feel the heartaches they've cost?

Will he gaze through all the fruitless toil,
To the underlying plan,
And catch a glimpse of the real intent
In the heart of the vanquished man?

I dare to hope he may pause some day,
From his labors, as I have done,
And gain some strength for his weary task,
From the battles that I have won.

But I've only the task itself to leave,
With all its cares for him to face;
And never a cheering word may speak
To the fellow who'll take my place.

Then here's to your health, old chap!
I drink as a bridegroom to his bride;
I'll leave an unfinished task for you;
Honestly solve it as I have tried.

I've dreamed my dreams as all men do,
But never a dream came true;
My prayer today is, that all your dreams
May be realized by you.

If we meet some day in the Great Unknown,
Far out in the realms of space,
You'll know my clasp as I take your hand,
And gaze in your tired face.

Then all our failures will be success,
In the light of the new-found dawn;
So I'm drinking the health of the dear old chap,
Who'll take my place when I'm gone.

Boys, this toast is no "Swan-song" from me,
I'll stay as long as I can,
And work as long as I can see;
And, to the end, I'll be a man.

THRIFT

THRIFT IN ITS LARGER SENSE
IS THE ART OF MAKING THE
BEST USE OF WHAT WE HAVE

ORAL SURGERY
CASE REPORTS

CONDUCTED BY HUGH W. MACMILLAN, D. D. S., CINCINNATI, OHIO
THIS DEPARTMENT AIMS TO REPORT INTERESTING ORAL SURGERY CASES IN BRIEF FORM, ILLUSTRATED BY RADIOGRAPHS AND PHOTOGRAPHS WHERE POSSIBLE. ARTICLES FOR THIS DEPARTMENT MUST NOT BE MORE THAN 500 WORDS IN LENGTH. SEND CONTRIBUTIONS TO DR. HUGH W. MACMILLAN, UNION CENTRAL BUILDING, CINCINNATI, OHIO.

I. PORCELAIN CROWN IN THE RIGHT BRONCHUS
II. ARTIFICIAL DENTURE IN THE ESOPHAGUS

Case III: Mrs. O. A. M., aged about 45 years, presented herself to her dentist on May 8th, 1917, to have certain infected teeth extracted. Nitrous oxygen was administered, and during the extraction a porcelain pin crown (cuspid), mounted on a carious root, slipped from the forceps and disappeared in the patient's throat. It was thought that the crown might have been swallowed. Purgatives were prescribed and the stools were watched, but the tooth did not appear. The patient was advised to return on the third day, at which time she complained of a slight cough. Upon fluoroscopic examination the crown was located well down in the right bronchus. Stereoscopic X-ray plates were then made (*Fig. 1*). On May 13th, 1917, operating in conjunction with Dr. J. W. Murphy, and employing cocain anesthesia, I passed a bronchoscope through the mouth and the post of the crown was located well down in the right bronchus. The crown itself was not visible, as it protruded into a lateral bronchus. The post was seized with a forceps and withdrawn with the bronchoscope. The patient made an uneventful recovery.

Case IV: Mrs. E. T., aged about 50 years, and afflicted with melancholia was admitted to the Cincinnati General Hospital on December 7th, 1917. She stated that about a week(?) before she had swallowed an artificial denture of two teeth, and that she had been unable to swallow since that time and that she had suffered a great deal of pain low down in the neck. An X-ray examination (*Fig. 2*) showed that the plate had lodged transversly in the upper end of the esophagus, immediately below and behind the larynx, which was pushed forward. Without any anesthetic the Jackson anterior commissure speculum was passed behind the larynx and the edge of the vulcanite denture could be seen and was seized with a forceps, but could not be extracted because of the firm impaction. A special instrument, known as a "mechanical spoon," which is really a potential hook, was then passed through the speculum and beyond the foreign body, which was then easily drawn into the mouth, when the hook caught on its lower border. The denture measured one and one-eighth inches in one diameter and one inch in the other. The patient recovered promptly from the throat condition, but convalescence was complicated by a thrombo-phlebitis in the left femoral vein, probably superinduced by the previous starvation.

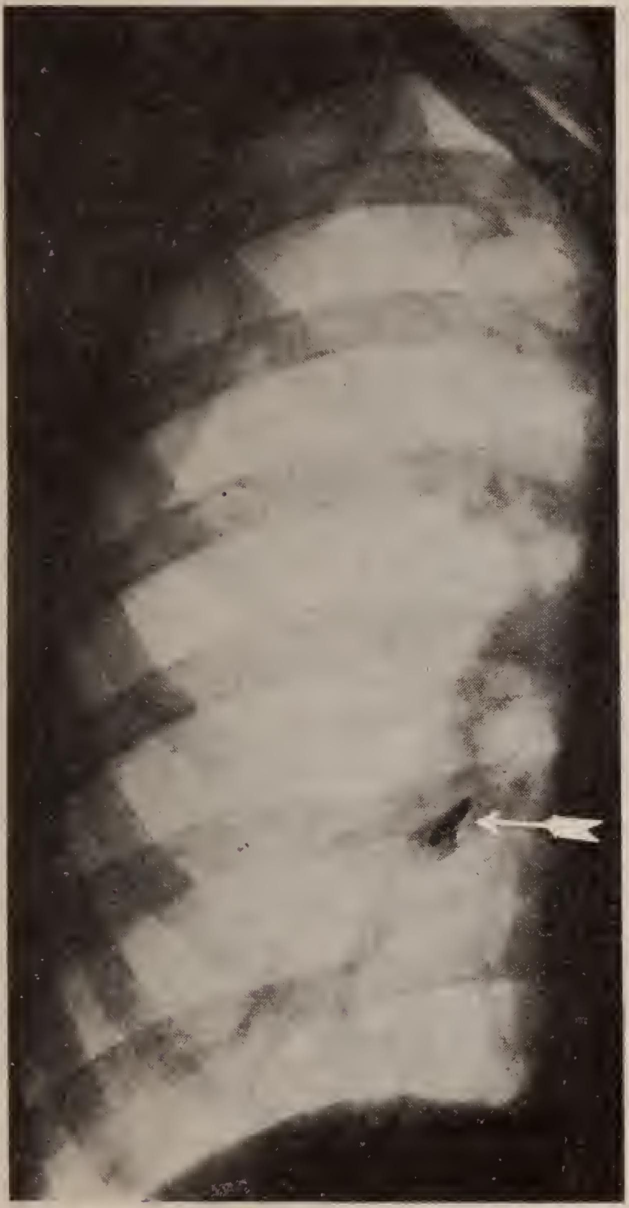

Fig. 1

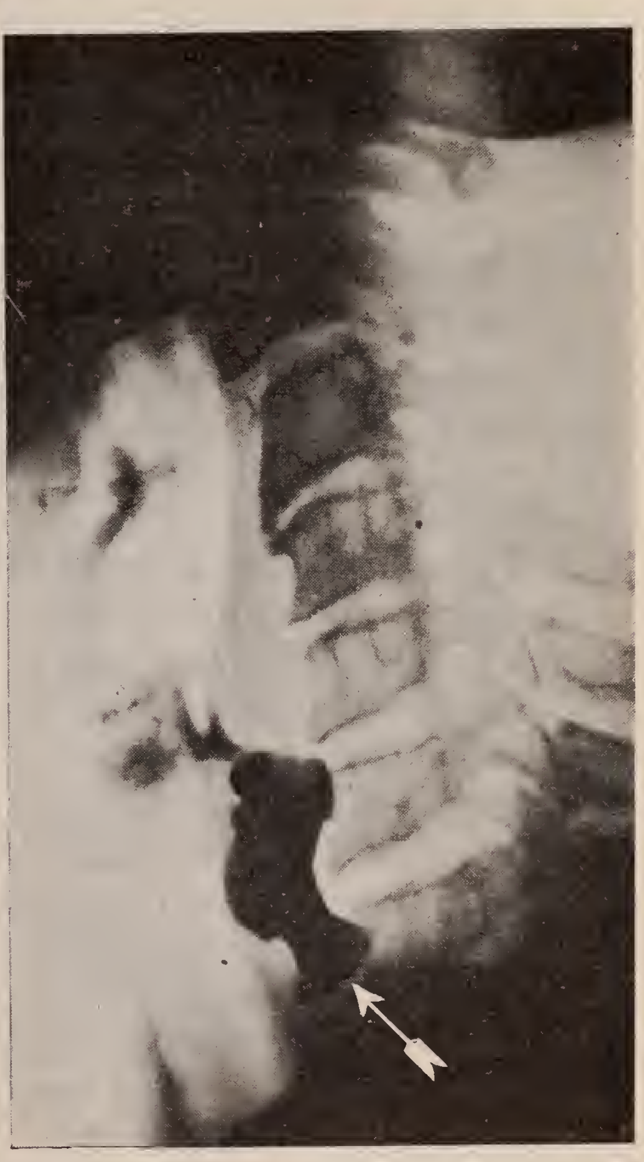

Fig. 2

Comment: In a recent paper on "Three Bronchoscopic Cases of Dental Origin" (Laryngoscope, Nov., 1917), Shurly has called attention to the frequency with which such accidents may occur, and figuring according to population estimates that possibly six hundred cases of similar nature have occurred in the United States and Canada during the last decade. Considering the danger attendant upon such accidents it is important that every preventive precaution, such as packing gauze into the mouth before operating, should be taken. In all doubtful cases roentgenograms should be taken in order to determine where the foreign body has lodged.

Reported by Samuel Iglauer, M. D., 707 Race St., Cincinnati, Ohio.

CORRESPONDENCE

EDUCATING THE PUBLIC

BY DR. A. L. HAMILTON, HOUSTON, TEXAS

EDITOR DENTAL SUMMARY:

Dear Sir: I want to commend and emphasize the sentiment of the paper by Dr. Burton Lee Thorpe in the SUMMARY for November. I wish it were possible to impress on each member of the profession the truth of his statement that "the sooner the dental profession banish some—I would say all—of their hide-bound ideas of ethics the better."

Ethics are strictly all right. But is it ethical to withhold from the public, information which would be for its benefit? Every man who possesses a knowledge which would benefit the public and does not make an effort to pass that knowledge on to his fellowman by every means possible is, to say the least, not a public-spirited citizen. I will go further and say that he lacks just that much of being a good citizen.

Honor is due the profession only in proportion to the service it renders to humanity and truly we are not rendering a full measure of service until we inaugurate an aggressive system of educating the public to the benefits to be derived from clean mouths and well-kept teeth.

Learned papers are constantly before us on the most approved methods for root-canal fillings, etc. What is needed most is to apply the rule of surgery, "remove the cause." That cause is ignorance and can be removed, to large extent, by education. However, some will say, "There is no use; they will do the same thing over again." I grant this to be true to an exasperating degree, but not entirely.

If that rule would hold good, then the preachers and reformers are wasting lots of valuable time.

Dr. Thorpe suggests that each local society have a press bureau for the preparation of educational copy for the public press.

I feel sure Dr. Thorpe will pardon my suggestion that we make it a National press bureau appointed from the National Association; this bureau to furnish authentic copy to the various newspaper associations who cover the whole country with their publications. This suggestion, I should think, would minimize the duplication of effort and put official information where it would do the most good.

I hope we may have an exhaustive discussion of this subject in your valuable journal and that a definite movement along this line may result in the near future.

511 Kress Building.

EDITORIAL

A GREAT OPPORTUNITY

Did you ever stop to think how really interesting life is?

Suppose at an early age the map of our life were revealed to us—here a sorrow, here a joy, poverty there and prosperity beyond; peace and comfort perhaps, or war and suffering. We would not have the courage to face the trials of life and many pleasures would not be such if we saw them in advance.

If you knew that a painful accident were to befall you next month, all the days until that time would be filled with anxiety and fear. If you knew that you were to see a long-lost friend tomorrow, there would be no joy of surprise at meeting him. The uncertainty of life, the hope we have and our faith are the things that make life bearable. Some call it a game where we win or lose; a stage, where we "strut our hour;" a book, where every page is a new day; or an adventure, where we journey forth to meet the world,—but why not call it a *Great Opportunity*.

We live today, we make mistakes, we fail in our aim, or perhaps we see our plans progressing toward a successful end, or we catch sight of a new ideal. But tomorrow!—a chance to blot out the mistakes and failures of today and to wipe out the traces of our disappointment. Tomorrow!—another day in which to strive for our goal, to battle for our convictions, to develop, to advance, to succeed.

It is a new day with new energy, new faith, new courage, new power, new endeavor. It is the same sun that rises but it sheds new light; the same sky overhead, but new clouds; the same world, but new events, new projects, new opinions, new aims.

It is Life's uncertainty that keeps our interest and our courage alive, but in its opportunity lies our hope.

The century is young, the year is new and every morning brings another day in which to give to our brother, to help our neighbor, to aid the oppressed, to foster patience and sacrifice at home and courage and bravery abroad, to fight for freedom and to give our lives for the world's democracy.

Could there be a greater opportunity?

OBITUARY

DEATH OF DR. JOHN W. DAVID

Dr. John W. David, of Corsicana, died at St. Paul's Sanitarium, Dallas, Texas, December 29, 1917. This announcement will be very sad news to his many, many warm friends in the profession, not only of Texas, but throughout the United States. For nearly four years his health had been more or less impaired as the result, first, of diabetes, and later of nephritis. He was buried with Masonic honors at Corsicana, December 31st.

Dr. David was in his fifty-fourth year. He graduated from the Baltimore College of Dental Surgery in the spring of 1891, and won the prize for operative dentistry. The same spring he joined the Texas State Dental Association at Waco, and it was his pride that he had never missed a meeting, his last one at Houston, April 25-28, making his twenty-sixth. At the meeting of 1900 at Dallas he served as president. He also attended many conventions of the National Dental Association and at the 1910 meeting, held at Denver, was elected vice-president from the south, and undoubtedly would have been elected president the next year had he attended.

He was a man of fine sense, of magnetic personality, a man of force and a leader among his fellows; a man of uncompromising honesty, a kindly, jolly, friendly man, who preferred to be on friendly terms with every one. He was too good and useful a man to be called away so early, for the world has too few of such men already, and many a heart that knew and loved him other than the members of his own family is wrung with sorrow at his death.

Jesse Bruce Durbin, president of the J. Durbin Dental & Surgical Supply Company, Denver, Colo., died at his home, 1410 Grant street, Denver, Colo., September 18, 1917.

Mr. Durbin was a past-president of the American Surgical Trade Association and well known by the surgical instrument dealers of the country.

Mr. Durbin was a member of the Sons of Colorado, having come to Denver from Canton, Ohio, his native state, in 1875. The greater part of his active life had been associated with the business of which he had of late years been the head, a concern established by his father, J. Durbin, in 1874.

SOCIETY·ANNOUNCEMENTS

Michigan State

The sixty-second annual meeting of the Michigan State Dental Society will be held at the Hotel Statler, Detroit, week of April 8-13, 1918. The regular meeting will be held on April 8th and 9th, with a splendid program. The remainder of the week will be a post-graduate meeting in charge of the Detroit Club Clinic, at which every important branch of dentistry will be covered.

C. G. Bates, *Secy.*,
Durand, Mich.

Illinois State

The fifty-fourth annual meeting of the Illinois State Dental Society will be held at Bloomington, Ill., May 14-15-16-17, 1918.

J. P. Luthringer, *Secy.*

Kentucky State Dental Association

The next annual meeting of the Kentucky State Dental Association will be held at Lexington, Ky., June 13-14-15, 1918. An "amalgam program of special interest." Address all corresponcence to Dr. W. M. Randall, Secy., Louisville, Ky.

North Carolina Society

The forty-fourth annual meeting of the North Carolina Dental Society will be held in Wilmington, N. C., June 19-21, 1918. Headquarters, Oceanic Hotel. W. T. Martin, *Secy.*

The Texas State Dental Society

The thirty-eighth annual convention of the Texas State Dental Society will be held at San Antonio, Texas, the famous City of the Alamo, April 10, 11, 12, 1918. Members of other state societies are cordially invited to attend. J. G. Fife, *Secy.*

736 Wilson Bldg., Dallas, Texas.

State University of Iowa

The dedication of the new dental building of the College of Dentistry, February 22nd, Alumni and College of Dentistry Clinic, February 23rd, 1918, Iowa City, Ia.

R. R. DeKruif,
Des Moines, Iowa. *Sec. Alumni Assoc., College of Dentistry*

Odontological Society of Western Pennsylvania

The thirty-seventh annual meeting of the Odontological Society of Western Pennsylvania will be held in the Hotel Chatam, Penn Avenue and Fourth street, Pittsburgh, Pa., Tuesday and Wednesday, April 9th and 10th, 1918.

The program committee promises one of the best dental meetings ever held; men of note will read papers of interest to the twentieth-century dentist. The clinics will be given by the study clubs of Western Pennsylvania and will be of interest to one and all. Exhibitors will be amply accommodated with space by addressing Dr. Leslie Waddill, Jenkins Arcade Building, Pittsburgh, Pa.

King S. Perry, *Secretary.*

719 Jenkins Bldg., Pittsburgh, Pa.

BIG UNION MEETING

Rehwinkel and Camp Sherman Dental Societies

To be held at Camp Sherman, Chillicothe, Ohio, Thursday and Friday, February 7th and 8th, 1918. The meeting and exhibits will be in the big Y. M. C. A. building at the camp. It will be a "hummer."

A number of noted dentists will be in attendance and take part in the meeting. The essayists will be of the big 16-inch gun caliber. The clinicians will be as effective as shrapnel and the discussions like barrage fire. Everybody should attend. Meals and lodging can be secured at the camp.

Minnesota State

The thirty-fifth annual convention of the Minnesota State Dental Association will be held February 7, 8, 9, 1918, at the University of Minnesota, Minneapolis, Minn. All members of the National Dental Association are invited to attend this meeting. For information address

1152 Lowry Bldg., St. Paul, Minn. Max E. Ernst, *Secretary.*

Trimming Elongated Teeth

The sentiment which often restrains us from trimming up an elongated tooth in the opposite jaw, "because it is a perfectly good tooth," is a fallacy which frequently gives rise to very faulty articulation, and is for the same reason a misplaced emotion; since, from a rational consideration of the entire mouth as a unit, we must conclude that such a tooth may be a *sound* tooth, but not, indeed, a *good* tooth until it is made to function normally.—*F. H. Orton, Dental Items of Interest.*

ADVANCEMENT OF DENTAL CORPS MEMBERS

Recommendations have gone from the Surgeon General of the army to the Chief of Staff in regard to advancement of members of the Dental Corps of the Regular Army, in accordance with the Act of October 6, 1917. This Act provides that the Dental Corps shall consist of commissioned officers of the same grade and proportionately distributed among such grades as are now or may be hereafter provided by law for the Medical Corps, who shall have the rank, pay, promotion and allowances of officers of corresponding grades in the Medical Corps, including right to retirement as in the case of other officers. The Act also provides that there shall be one dental officer for every thousand of the total strength of the Regular Army, authorized from time to time by law. Prior to this Act, dental officers above the rank of captain were not authorized. In accordance with the recommendations of the Surgeon General, of the 178 members of the Dental Corps, 12 will be promoted by seniority to colonel, 20 to lieutenant colonel and 87 to major, leaving the remainder in the grade of first lieutenant for the time being. These advancements will take up at least to the grade of major all who were members of the Dental Corps at commencement of the war and some who have entered since that time. The Surgeon General's office also is making arrangements to recommend a corresponding reorganization in the Dental Reserve Corps and to give increased rank to selected officers whose attainments and records warrant recognition.

During the present emergency dental surgeons of the rank of first lieutenants who have served one year in that grade will be examined with a view to advancement to the grade of captain. Promotions to grades senior to that of captain will be made to fill vacancies existing. If the present emergency terminates, of course the first lieutenants of the Dental Corps will have to serve five years in that grade before promotion. The provision in the law of October 6th for recommissioning of officers of the Dental Corps provides that they shall be commissioned as first lieutenants, captains, etc., instead of as dental surgeons with the rank of first lieutenant, etc.—From the *Army and Navy Register*, December 22, 1917.

PROPOSED LEGISLATION FOR NAVAL DENTAL CORPS

The National Dental Association, at the New York meeting, approved legislation placing the Naval Dental Corps on an equal status with the Naval Medical Corps, similar to the conditions existing between these two corps in the army, as enacted by Congress, October 6, 1917. The legislative committee was instructed to promote this approved legislation at such a time and under such conditions as would seem most favorable. In this connection and in view of some of the conflicting and discouraging reports regarding what was secured through the Army Dental Corps legislation, it was deemed advisable to wait for this to be officially interpreted before starting legislation for the Naval Corps. This has just been interpreted to our entire satisfaction, which prompts us to follow the phraseology and general plan of procedure of the Army Corps legislation. Therefore, the following bill was introduced January 5, 1918, by Senator Lodge:

S. 3386

A BILL To provide for commissioned officers of the Dental Corps of the Navy the same rank, pay, promotions and allowances of officers of corresponding grades in the Naval Medical Corps, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Dental Corps of the Navy shall consist of commissioned officers of the same grades and proportionally distributed among such grades as are now or may be hereafter provided by law for the Medical Corps, who shall have the rank, pay, promotions and allowances of officers of corresponding grades in the Medical Corps, including the right to retirement as in the case of other officers, and there shall be one dental officer for every thousand of the total strength of the Navy and Marine Corps authorized from time to time by law; Provided, That dental examining boards shall consist of one officer of the Medical Corps and two officers of the Dental Corps; Provided further, That immediately following the approval of this Act all members of the Dental Corps now in active service shall be recommissioned in the Dental Corps in the grades herein authorized in the order of their seniority and without loss of pay, rank, allowances or precedence in the Navy; And provided further, That nothing in this Act shall be construed as in any way affecting the original appointment of officers to the Dental Corps as provided in the "Act approved August twenty-ninth, nineteen hundred and sixteen, making appropriations for the naval service for the fiscal year ending June thirteenth, nineteen hundred and seventeen, and for other purposes;" And provided further, That when ordered to active duty officers of the Dental Reserve Corps shall receive promotion in rank under the same relative conditions and provisions of active service as is provided in this Act for the Navy Dental Corps.

It should be distinctly understood that this legislation is entitled to and should receive the liberal support of the profession generally. To that end we especially and respectfully request that the *officers of all dental societies promptly write their Senators and Representatives endorsing this legislation and soliciting their support of same.* It is assumed that all dental societies, at some time, have endorsed this general legislative program and it is therefore suggested that official stationery be used in writing and that you be specific in stating that you express the views of your society. Individual letters are very necessary, especially from those who professionally serve or are acquainted with their Senators and Representatives, and further, it is very important that the merits of this legislation be most favorably presented to the members of both the Senate and House Naval Affairs Committees, as committee support is an essential requisite. (A list of these is hereinafter incorporated). In these letters it can very properly be stated that this proposed legislation is in exact harmony with what was enacted by Congress, October 6, 1917, for the Army Dental Corps and, as a question of justice, the same conditions should be provided for the two branches of the service. This appeal demands your prompt attention and will appreciate it if you will please forward to me such replies as are distinctly favorable or unfavorable, as this makes it possible to keep in touch with the situation in an advantageous way.

The following is a list of the committees above mentioned as published in Congressional Directory, April, 1917:

Senate Naval Affairs Com.

Benjamin R. Tillman, So. Car.
John Walter Smith, Maryland
Claude A. Swanson, Virginia
Jas. Hamilton Lewis, Illinois
James D. Phelan, California
Key Pittman, Nevada
Thomas J. Walsh, Montana
Robert F. Broussard, Louisiana
Peter G. Gerry, Rhode Island
Park Trammell, Florida
Henry Cabot Lodge, Mass.
Boies Penrose, Pennsylvania
William Alden Smith, Mich.
Carroll S. Page, Vermont
Miles Poindexter, Washington
Warren G. Harding, Ohio
Frederick Hale, Maine

House Naval Affairs Com.

Lemuel P. Padgett, Tennessee
J. Fred C. Talbott, Maryland
Albert Estopinal, Louisiana
Daniel J. Riordan, New York
Walter L. Hensley, Missouri
John R. Connelly, Kansas
William B. Oliver, Alabama
William W. Venable, Mississippi
Carl Vinson, Georgia
Adam B. Littlepage, West Virginia
James C. Wilson, Texas
Thomas S. Butler, Pennsylvania
William J. Browning, New Jersey
John R. Farr, Pennsylvania
Fred A. Britten, Illinois
Patrick H. Kelly, Michigan
Sydney E. Mudd, Maryland

H. C. Brown
Columbus, Ohio
Chairman Legislation Committee

RESOLUTIONS OHIO STATE DENTAL SOCIETY

Whereas, For many years the dental profession has earnestly sought to impress upon our Supreme Law-Making Body the need for efficient dental service in the ranks of our armed forces; and

Whereas, For some years after its establishment this service failed to attain its greatest possibilities for good because of the meager reward open to members of the Dental Corps, due to limitations of rank and promotion; and

Whereas, In this failure to recognize and suitably reward the services of the Dental Corps the entire dental profession has suffered an unmerited slight; and

Whereas, Through the persistent and untiring efforts of the Committee on Legislation of the National Dental Association, Congress did, on the sixth day of October, 1917, enact such legislation as gives to the Dental Corps of the Army all that has been asked for it as to rank and promotion, thus removing from the entire dental profession the stigma heretofore resting upon it; and

Whereas, The chairman of the said Committee on Legislation of the National Dental Association has been particularly active and insistent for those high ideals with which he was from the first imbued and to his disinterested devotion to duty, regardless of personal cost, final success has been chiefly due. Therefore be it

Resolved, That we, the Ohio State Dental Society in regular session assembled this fifth day of December, 1917, do hereby extend to our fellow member, Doctor Homer C. Brown, our most sincere congratulations and the thanks of the dental profession of the state of Ohio for that which has been accomplished largely through his instrumentality for the betterment of the Dental Corps of the United States Army, for the recognition of our profession and for the welfare of our men under arms; and be it further

Resolved, That these resolutions be made a matter of permanent record in our proceedings, that they be sent to the *National Dental Journal* and to The Dental Summary, and that an engrossed copy be presented Doctor Brown. Adopted, December 5th, 1917.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

ANNOUNCEMENT

Beginning July 1, 1918, the subscription price of THE DENTAL SUMMARY will be increased as follows:

United States and Possessions	$1.50
Canada	1.90
Foreign, U. P. U. Countries	2.25

This increase is made positively necessary by the rise in the price of paper and cost of production generally, and will remain in force only so long as war conditions prevail.

Subscriptions received prior to the date named will be accepted at the old rate.

LACONIGRAMS

The year ending June 30, 1917, was the greatest in the history of international commerce. The total of the trade of the United States with foreign countries was the greatest in the history of this or any other country. Total value of imports and exports was $8,953,000,000. Total previous year, which also made a record, $6,531,000 000. It was more than double the highest figure ever recorded in normal times.

However long the war may last and however great may be its cost, every dollar of that cost can be recompensed if lessons of thrift can be taught thoroughly to the people of the United States. Buy War Savings Stamps 'till it hurts.

"Try all things; hold fast that which is good"—for *you*, and for the love of common sense and our common humanity, do not jump around like a grasshopper on a frosty morning trying to follow every crank and extremist that bobs up with something that he thinks is sure to revolutionize the profession.

Have you ever said out loud—"This is *my* war?" Try it now—say aloud—"This is *my* war."

There are two kinds of ethical conduct—negative and positive. The first does not interfere with the rights of others; the second interests itself in helping others to secure their rights. The first is that of the average "good" man; the other is that of the benefactor of his race.

Tell your patients that the less sugar they eat the better will be their teeth and the longer will they serve them well.

The kaiser's personal dentist, Dr. Arthur N. Davis, formerly of Piqua, Ohio, has at last found Berlin and Germany generally uncomfortable, and has returned to his native land. It is reported that he has some interesting information that our officials will endeavor to obtain.

Before attaching all the importance in the world to the X-ray, it may be just as well for dentists to learn something about reading the films.

The dentists of Grand Rapids (Mich.) raised $350.00 to be used to buy sweaters for the soldiers. They "kicked in" with six dollars apiece.

The substantial men of the coming years will be those who had the saving habit when they were young Uncle Sam is not too busy in this greatest of wars to forget his coming manhood. He wants a more prosperous and independent people for the future—hence War Savings Stamps and Thrift Stamps. Buy them to show your appreciation.

There was no escape; we simply had to do it; there was but one alternative and that was one that we refused to consider. The subscription price simply had to advance. Of course, there are some who will think and even be so uncharitable as to *say* that the publishers are too greedy; that they [illegible] not making money enough to suit the[illegible] stuck another fifty cents onto the pr[illegible] such I have just a word or two to say: THE DENTAL SUMMARY never has anywhere nearly paid for itself, not in all its thirty-eight years; and I have no idea that it ever can. So long as the annual deficit ran along about an even figure, not very far from the earnings of our most prosperous dentists, we held our peace, pocketed our loss and went on our way. But last year, with the cost of plain, white, unprinted paper running around $350 per month more than ever before, the matter ran far beyond any conceivable estimate. Anyhow, THE SUMMARY is worth ten times its price to any dentist, and neither apology or explanation ought to be necessary; and one is offered solely because in these pages I just sort 'o take you fellows into my confidence and tell you things that are not commonly talked about in "kultured" circles; as a matter of fact, well-kultured circles usually are silent, with the silence of the grave.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVIII March, 1918 No. 3

We Publish the Proceedings of the Following Societies:

The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
Iowa State Dental Society
Texas State Dental Society
Tennessee State Dental Society
Section on Stomatology—American Medical Association
Interstate Association of Anesthetists
and Several Local Dental Societies

Editorial Office: 195 16th Avenue, Columbus, Ohio
L. P. BETHEL, M.D., D.D.S., Editor-in-Chief

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Neither the editor nor publisher is responsible for the views expressed by authors in the reading matter published by THE DENTAL SUMMARY

REGULAR CONTRIBUTIONS

A SIMPLE FORM OF REMOVABLE BRIDGE WITH CAST CLASPS*

BY [illegible]RMAN BEVERLY NESBETT, D.M.D., BOSTON, MASS.

INSTRUCTOR IN INLAY TECHNIC, DENTAL DEPARTMENT, HARVARD UNIVERSITY. SPECIAL LECTURER POST-GRADUATE SCHOOL OF DENTISTRY, COLUMBIA UNIVERSITY

THE BRIDGE about to be described is a type adapted to fill spaces caused by the loss of bicuspids and molars in either jaw. I make no claim that it can be used *everywhere* in the mouth to supply missing teeth. In fact, I believe no single system of bridge work is universal, despite the claims of its advocates.

This bridge, then, is a modified form of the old Bonwill bridge, using two stop-clasps, better known today as lug-clasps. Dr. Prothero, in his late work on "Prosthetic Dentistry,"[1] says: "Without doubt this form of clasp, or some modification of it, in which the stop principle is embodied, is the most satisfactory and serviceable of any of the common types of partial-band clasps. By the addition of the stop, frictional wear of the enamel practically is overcome, undue pressure on the alveolar process covered by the bridge and on the gingiva surrounding the tooth clasped is obviated, and a feeling of security and comfort to the wearer of the bridge results, not possible to be realized from the use of the ordinary type of clasp. The credit of having evolved, demonstrated and described the practical applicability of the stop-clasp should be ascribed to Dr. Bonwill."

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*Part of three lectures given before Four-States Post-Graduate Dental Meeting, New Orleans, La., June 4, 5, 6, 1917.

(1) J. H. Prothero, D.D.S., Prosthetic Dentistry. Second edition, 1916, Medico Dental Publishing Co., Chicago.

The appliance I am describing in this paper is the result of experiments begun late in 1913 to supply a missing tooth in my own lower jaw. After a number of spring-clasp and wire attachments had failed, I succeeded in making a bridge with cast clasps that has been worn with comfort and efficiency for nearly four years. That the dental profession was in much need of such an appliance has been best evinced by the interest shown since I began my experiments and first exhibited some completed bridges.

The appliance has replaced, in many cases, pieces of fixed bridge work and bent-clasp appliances, and in every instance the patient has reported more comfort and efficiency in chewing food. And, after all, you must realize that the patient has the final word on this subject. In the case of my bridge, I was the patient, so I *know*.

It has been my privilege during the three years I have been working out the technic of this bridge to make them for several *dentists* to use in their own mouths; for the wives of several dentists, and for the patients of about twenty-five different dentists. I consider the report of some two hundred cases taken this way to be of more value than if they were all from one practice.

It has proved conclusively also that the indirect method used in making the bridge was successful, providing the steps were carried through correctly. [2]I know this has been questioned quite a little since my first paper on this subject. But in every instance where the practitioner has taken a correct plaster impression and obtained a correct bite, the bridge has gone to place with little or no adjusting and has been useful from the first hour.

INDICATIONS FOR USE

Cases with both abutment teeth sound, with hard dense enamel, teeth usually badly tipped or out of line, or both; and with the dentist, and, more than probable in these days, the patient, averse to devitalization, are ideal ones for this method. Just these cases are the ones most of us have sidestepped without any attempt to supply a tooth, because

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(2) *Dental Items of Interest*, August, 1916.

we were not satisfied with any of the known methods of supplying that tooth.

The next indication for use is in places where a fixed bridge has been used—say, from first bicuspid to second molar—and like most fixed bridges, has begun to slowly but surely loosen the abutment teeth. The removal of the fixed bridge, placing of well-filled caps on abutment teeth, and substitution of a cast-clasp bridge will result in a tightening of the abutment teeth.

If this type of bridge is desired to be used on small teeth with thin, chalky enamel, with many fillings in place, it is preferable to make well-fitted shell caps and cement them to place before taking the impression for the bridge. The more the teeth are tipped the more this type of work is indicated, as it is a comparatively easy matter to cap these teeth individually—and an entirely different matter to attempt the parallelism necessary for a fixed bridge.

A particularly fine piece of work may be done by casting the caps with recessed places to accommodate the clasps and lugs, so that when the clasp is placed upon the crown there is no break in the outline of the tooth.

FIXED VS. REMOVABLE BRIDGE WORK

Taking all points into consideration, a removable bridge is the only sane appliance to put into the human mouth. It is my conviction that a removable type of bridge should be employed *whenever possible*, and that a fixed bridge should be *used only* where it is impossible to construct a *satisfactory removable* one. That I am not alone in my belief would seem to be borne out by the fact that several well-known dentists are wearing cast-clasp bridges to replace one or more missing teeth. It is interesting to note that not one of these men was willing to have a fixed bridge constructed for two reasons: First, because it involved more or less mutilation of two perfectly sound teeth; and second, because of the great difficulty, I might say impossibility, of keeping the fixed bridge perfectly clean. If we are not willing to put fixed bridges in our *own* mouths, why should we be willing to put them in the mouths of our patients? The Golden Rule is just as effective today, my friends, as when it was first written.

If we are to accept the tenet that nature knew what she was about when she so placed our teeth that every one is free to move slightly when stress is placed on it, then we must believe that some form of removable bridge work is indicated.

[3]"From a hygienic point of view there can be no question as to which is the best. It is impossible to thoroughly cleanse and sterilize any fixed bridge, as there is nothing which can be taken in the mouth

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(3) F. A. Peeso, D.D.S., Crown and Bridge Work. First edition, 1916, Lea & Febiger, Philadelphia and New York.

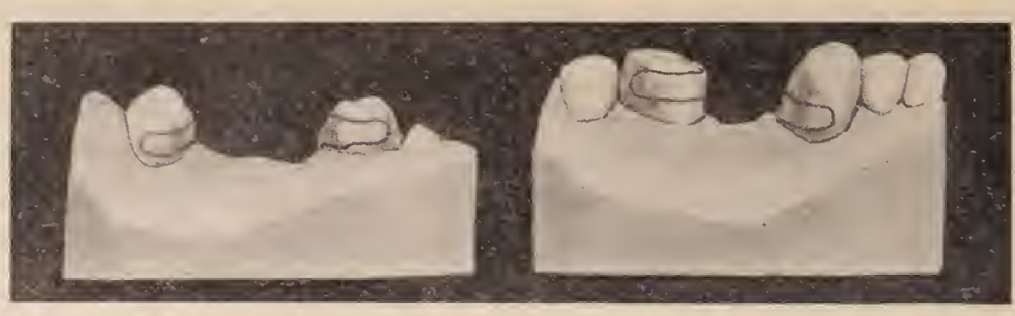

Fig. 1.—Two cases with upper cuspids utilized.

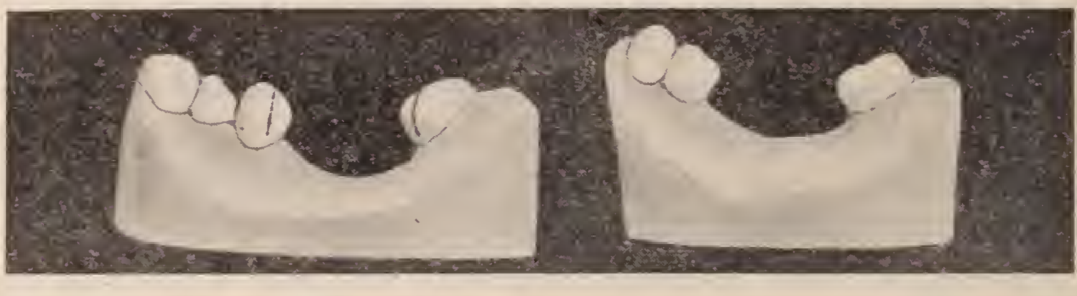

Fig. 2.—Two cases with badly-tipped teeth.

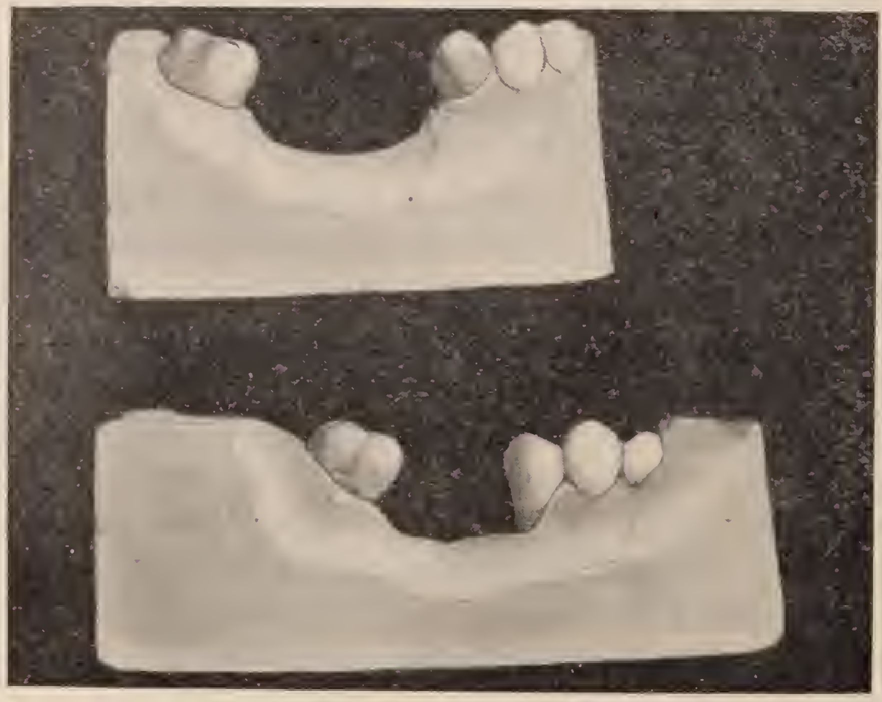

Fig. 3.—Two long-bite cases.

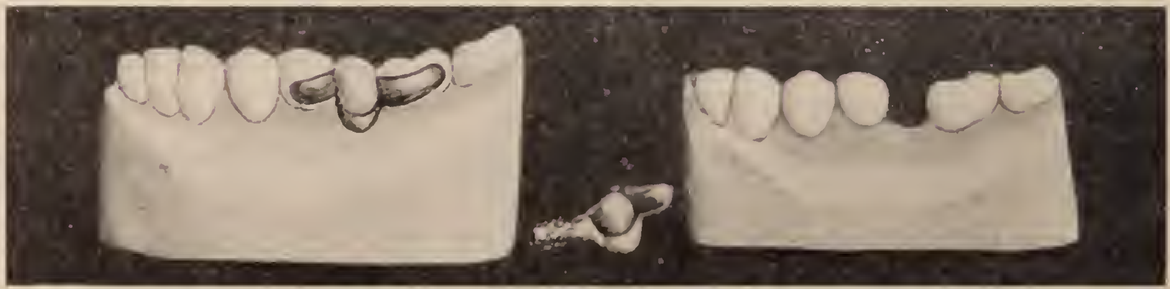

Fig. 4.—Models showing appliance in use four years in author's mouth.

that is of sufficient strength to perfectly cleanse and sterilize it without injury to the soft tissues."

CONSTRUCTION TECHNIC

The construction, although simple, is not easy and requires the utmost attention to detail and care in every step of the process. [3]"The value of removable bridge work depends entirely upon the attention given to the numerous details and upon the *accuracy* with which the work is done. The fittings must be as nearly perfect as it is possible to make them; otherwise the work will not prove a success. The training which one gets in doing this class of work tends not only to make him more proficient in bridge work but more proficient in every branch of the profession, as the care and skill required develops a delicacy of *touch* and *exactness* in manipulation to a greater degree than does the ordinary routine of the dental work room."

PREPARATION OF TEETH AND IMPRESSIONS

The abutment teeth to be clasped are cleaned and polished and the occlusion noted, for space must be provided for the stops or lugs at *this time,* if it does not exist. Deep grinding is not necessary and is to be deplored, as it leads to rapid decay.

Next, an accurate plaster impression is taken, and this is the keynote of the whole process, for these clasps have practically an inlay fit; and *under no circumstances* should attempts at bending be made to correct any error in fit.

A small swivel crown and bridge tray is oiled and the impression plaster mixed much thinner than for other impression work, for we wish to obtain sharpness and definition in all our tooth-lines, and the stiffer mix of plaster will not flow into undercuts caused by tipped or leaning teeth. When the plaster has *started* to set, the tray is removed and the plaster scored at suitable points so that it can be removed in sections. Then the plaster is allowed to complete its setting to a point where it will break with a clean, sharp fracture. The resulting sections are then removed, taking care to preserve all small, but possibly important, fragments.

The impression plaster used is French's, as it is a standard plaster and runs fairly uniform. For such a thin mix a *hastener* has to be used, and I prefer a saturated solution of potassium sulphate (now $1.25 per pound; 15 cents in 1914). The proportions are as follows: Two F. drams or dessertspoonful pot. sul. to six F. drams or three dessertspoonfuls water. Add plaster as fast as possible with only enough stirring to avoid lumps. This mix gives but ten seconds' working time for placing in tray and getting to place in the mouth, so you cannot travel all over the office with it before getting it to place. The oiled

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(3) F. A, Peeso, D. D. S., Crown and Bridge Work. First edition, 1916, Lea & Febiger, Philadelphia and New York.

tray can be removed in twenty seconds; plaster scored in one minute—break and remove in two minutes.

A plaster mix made in this manner can be used as thin as will stick in an inverted tray. It takes every sharp line and holds it without "mushing," sets promptly and rapidly enough so that it usually can be removed before any great amount of saliva collects in the patient's mouth—a great advantage. It does not make a *strong* mix, but that is *not desired*, as such a mix *breaks out with too much difficulty*. A *prompt, firm setting, without great strength* is what is desired.

Plaster is by no means easy to use and several impressions must be taken in some cases having long, tipping teeth, before one accurate enough to be used can be obtained. Under no circumstances should a poor or incomplete impression be used with the idea of correcting the defects in the model by carving, as failure or only partial success surely will result. Next, a modelling-compound impression of the opposing teeth, a small guide-bite in wax, and shade of teeth are taken. If this data is accurately obtained, the patient need not be seen again until the bridge is ready.

The plaster impression should be put together as soon as fairly dry, using the tray for a matrix or guide for the proper position of the pieces. Personally, I find it almost impossible to get the pieces in their proper places without some slight distortion, unless I place them in the tray and then secure them with sticky wax. The impression is then coated lightly with shellac; this dry, then sandarac varnish, being careful not to use either coating too thick. When the last coat of sandarac is thoroughly dry, the impressions of the two teeth that are to be clasped are packed with amalgam, first sinking small tapered metal dowels of rectangular cross section in the amalgam before it begins to set. Care should be taken to shape and smooth these dowels so that they will draw easily, and to set them nearly parallel as possible so that both teeth, no matter how badly tipped, can be removed in the same plane.

After the amalgam has set hard enough so that the dowels are firm, the dowels are *oiled* and the balance of the impression packed with Weinstein's artificial stone. Plaster can be used for this part, but the artificial stone gives a more satisfactory working surface. This new material—a calcium-barium-silicate—is an almost invaluable material for the crown and bridge worker. Models made from it are remarkably hard and durable and it possesses practically no expansion or contraction.

The compound impression is next poured and the two resulting models are mounted on an anatomical crown-and-bridge articulator, using the wax guide-bite to establish occlusal relations.

We now have a working model, correctly articulated, with two removable amalgam teeth, having their dowel pins in the same plane so that both teeth can be removed freely.

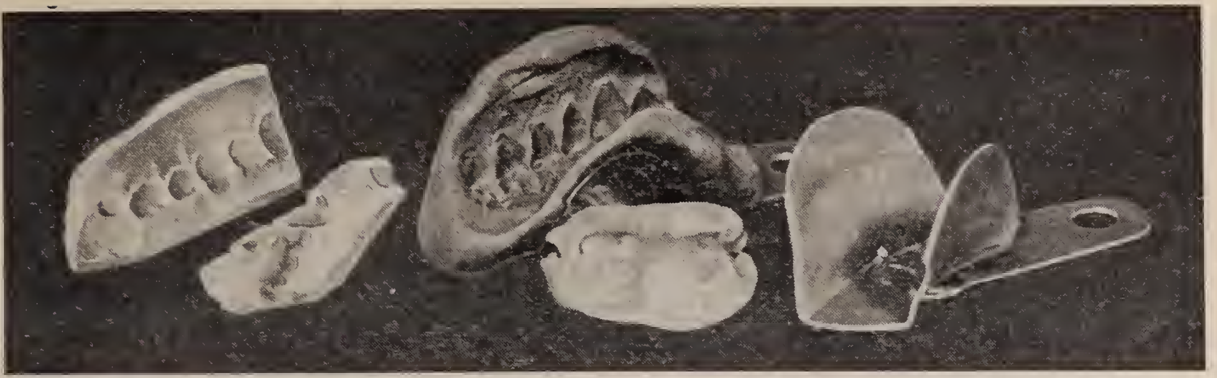

Fig. 5.—Correct impression tray; plaster in sections; compound impression and bite.

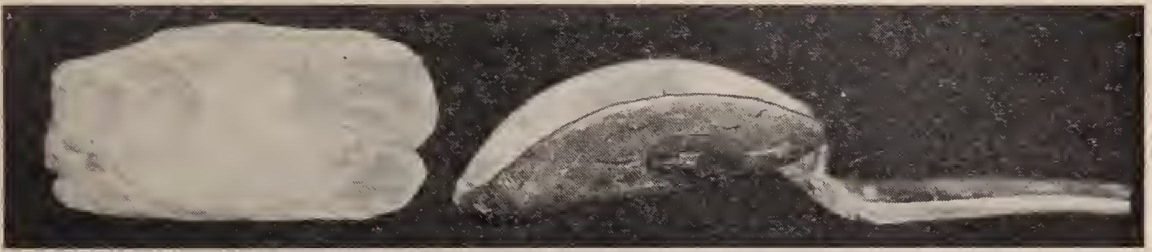

Fig. 6.—Incorrect tray and wrong method of removing plaster in one piece.

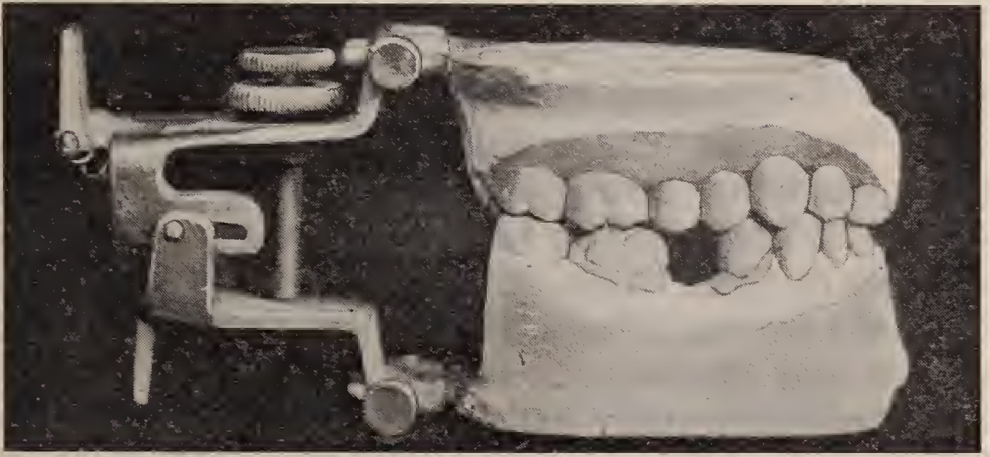

Fig. 7.—Working model and appliance.

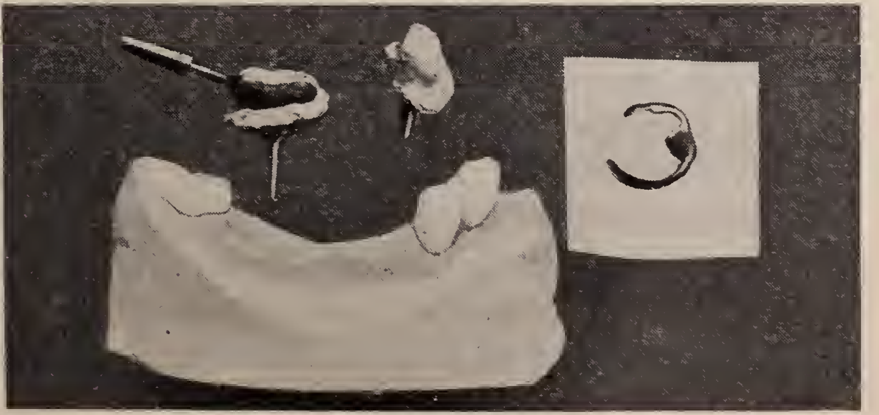

Fig. 8.—Casting wax with Taggart sprue attached; removable teeth with dowel pins. Finished clasp at right.

The clasps are then outlined with pencil on the amalgam teeth and waxed up for casting as follows: A piece of thin-sheet casting wax (No. 28 gauge) known as Solbrig's sheet wax, is warmed and adapted very closely to the *entire surface* of the tooth, which has been previously slightly oiled *between the lines marking the clasp outline only.* This wax matrix is then reinforced by flowing on Taggart's green casting wax to the desired thickness, which, of course, varies with the case. The pencil outline previously marked on the tooth can be seen through the covering of pink wax, and serves as a guide both for waxing up and subsequent trimming. After sufficient wax has been added and smoothed up, the tooth is chilled in ice water and the pink wax trimmed away to the desired outline of the clasp. A sprue wire is next attached, the wax again chilled in water and removed from the amalgam tooth. This has to be done with great care so as not to distort the wax pattern. With a little patience it usually can be accomplished and, if the waxing up has been done accurately and the wax pattern kept chilled, the two ends of the wax clasp will be seen to spring back to position as the clasp passes over the slight bulge of the tooth. If the wax opens up and does not spring back to position, or if it is badly distorted in removal, do not attempt to place it back on the tooth, but wax up another. Any attempt at patching a wax-clasp pattern or placing it back on the model after once removed always results in a too loose-fitting clasp.

CASTING TECHNIC

Unless a technician understands a few fundamental principles as applied to dental metal casting, he cannot hope for much success in casting clasps. I speak of this because many batches of the casting metal have been returned to the dealers as "scrap" because the dentists purchasing it did not understand the first principles of casting. I have used somewhat over fourteen ounces of casting gold known as the "E" formula, both experimentally and in practical cases, and never have turned back a grain to the dealers except in the form of filings and grindings. As a user and believer in the superiority of the Taggart process and casting machine, I use an *expanding* inlay investment, and cast in a cold mold, using *low* pressures for casting.

Following is my casting technic, used both for inlay and clasp casting: All work is done at as near room temperature as possible. I have found but few reliable *expanding* inlay investments on the market, so my choice is either Taggart's or Weinstein's formula. All investments are mixed in definite proportions by the use of a weighing device and the wax pattern invested as *soon as possible* after it is removed from the model to guard against possible distortion. Sprue sizes used are generally 16 or 18-gauge (B. & S.).

Just as soon as the "initial set" of the plaster in the investment has taken place the sprue wire is removed and the flask placed over a low heat to dry out. *In no instance* where an accurate fit is desired is the flask allowed to remain for longer than an hour before the drying-out process is commenced. [4]"It is hard to determine the actual principle involved, and it is not important to do so, but the fact does exist that castings made in a green mold, or one that is not allowed to air-dry, are more accurate than those made in an air-dried mold." In addition, under such conditions—air drying—the investment is very apt to crack or split upon heating (cause of "fins" on castings). Preparing a mold for casting should be done very carefully—as usually *is not* the case.

[4]"The initial stages of the heating should be at a temperature that will not permit the wax to run out of the mold, as it is important that the wax be absorbed in the mold. Forced heating and a generation of too much steam during the initial stages of the drying process will force the wax out of the sprue hole and produce a rough interior which, in turn, will show its effects upon the casting; the resultant casting being rough, incorrect and usually unfit for use." After all moisture has been driven off the wax should be burned out as quickly as possible without over-heating the investment, which never should be brought up to red heat, bearing in mind that plaster decomposes and disintegrates at a temperature around 375 degrees F.

[4]"Prolonged heating of the investment after the wax has burned out is even more dangerous than under-heating, as plaster of Paris, which is the binder, *shrinks in proportion to the time that it is exposed to heat.*" I repeatedly have dried and burned out a Taggart mold in twenty minutes, although from thirty to forty-five minutes is the usual time consumed. The flask is then allowed to cool so that it can be carried to the casting machine in the hand. For the average size inlay or clasp from three to three and one-half dwt. of metal are used, and great care is used not to over-heat the metal. [4]"While the ordinary gas-and-air blow-pipe is capable of producing temperatures only somewhat beyond 2400 degrees F., it is possible to obtain without difficulty 3400 degrees F. to 3500 degrees F. from nitrous oxid and illuminating gas, and over 4000 degrees F. from pure oxygen and illuminating gas. It is very difficult to avoid super-heating gold when applying such extreme temperatures, and great caution must be exercised by the operator. As a rule the cold flask is indicated when using extreme temperatures for melting the gold, because the gold melts very rapidly (fifteen to twenty seconds) and comparatively little heat is transmitted to the mold. The mold is then comparatively cool at the moment of casting, and even if somewhat super-heated gold is cast, it is not so apt to unite with the investment as when both the gold and the mold are super-heated."

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(4) L. J. Weinstein Dental Metallurgy; F. A. Peeso's Crown and Bridge Work.

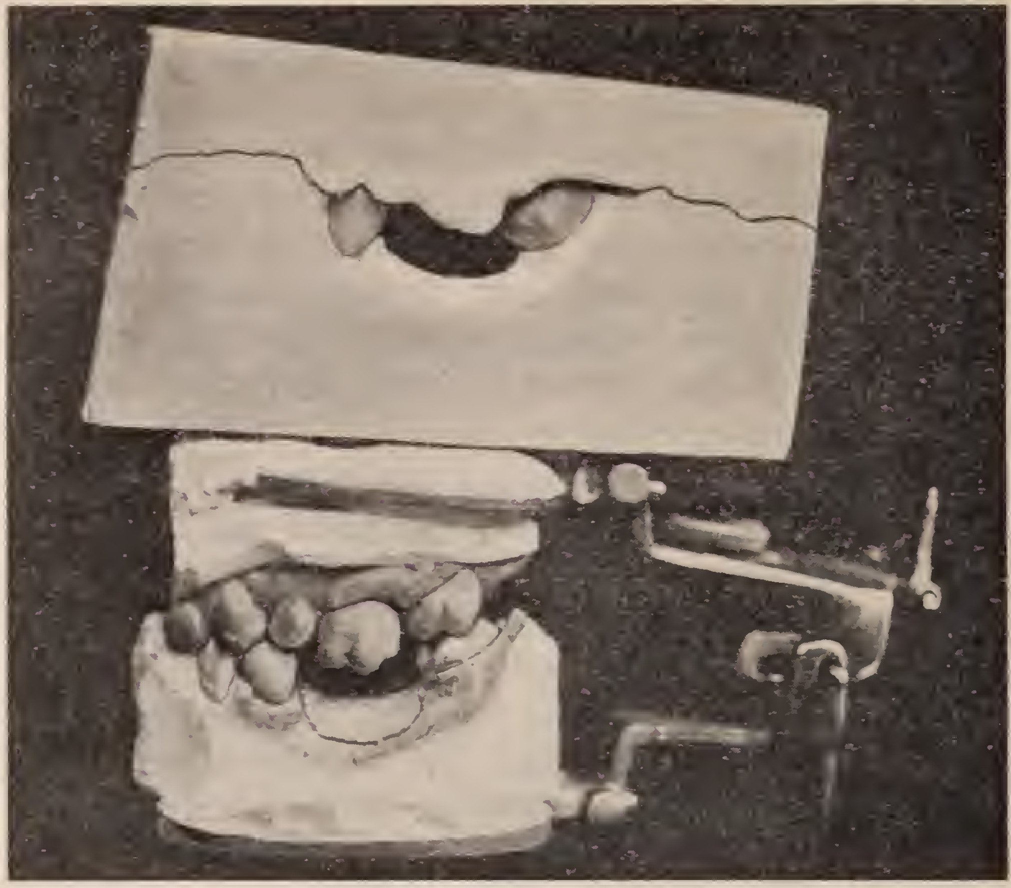

Fig. 9—Two short-bite cases.

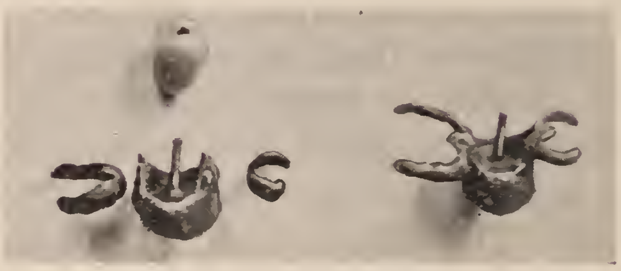

Fig. 10.—Clasps and middle section; case ready to assemble (at left). Sections assembled (at right).

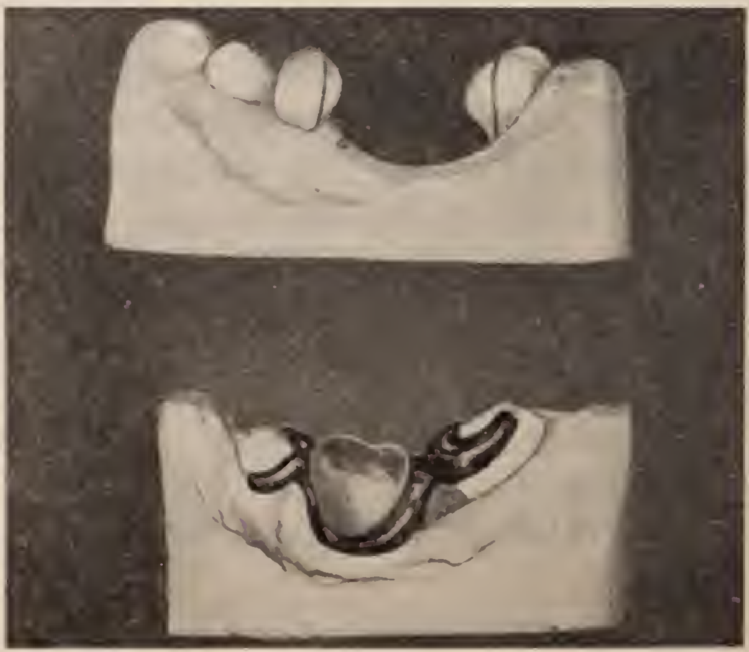

Fig. 11.—Utilizing a leaning molar.

[5]"It has been observed, when metals are cast at *too high* a temperature or are allowed to cool *too slowly*, that the resulting crystals are of large formation resulting in a weaker casting. This tendency in steel casting is known as 'myotism.' Casting in a cold flask is of great importance in clasp casting, as it cools the molten metal very rapidly, which as we have observed in the case of steel castings, results in a casting of greater density, strength and resiliency."

The casting pressures used range from two and one-half pounds for a small inlay to ten pounds for a large casting where two or more pins are "picked up." About five pounds are used for casting most clasps. [4]"One of the most prolific causes, in fact, perhaps the *greatest* cause that is productive of faulty castings, is the excessive pressure used in forcing metal into the mold. The principal reason for this is that in a majority of casting apparatus there is no provision for obtaining a definitely-measured and indicated amount of force. It takes just so much and no more pressure to force gold into a given mold and hold it there until solidification begins. Excessive pressure will not, under ordinary conditions, prevent the normal contraction of gold, because the mold into which the gold is cast yields, and hence will distort in the same proportion as excessive pressure is applied. It may be true that a pressure of 2000 pounds per square inch may totally prevent contraction, but what would become of the mold?" [4]"It is unfortunate that more operators do not realize the true value of an efficient casting apparatus, and the false economy resulting from the use of an intrinsically faulty or make-shift device." (L. J. Weinstein.) [4]"By using a grade of silica of maximum *expansion*, and a grade of plaster of minimum contraction, it is possible to produce an investment compound that will follow the flask walls when heated, and which will in some measure compensate for the two per cent. shrinkage of all castings."

CASTING METALS USED

A history of the experiments made to determine a suitable alloy for casting clasps might be interesting but not necessarily instructive. It took me two years, as alloys had to be tried out in actual use as well as in laboratory tests. For most of the metallurgical data and work I am indebted to L. J. Weinstein, of New York, a graduate of the School of Mines of Columbia University, and Director of the Columbia Post-Graduate School of Dentistry. The actual working tests in the mouth and the technic of clasp casting I had to work out myself. The clasp casting alloy that has been put on the market after exhaustive tests proving its worth, is a combination of an alloy known as "elastic" gold and No. 68 solder. The elastic gold gave good results but had too high a melting point which, as has been outlined, is detrimental if

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(4) L. J. Weinstein Dental Metallurgy; F. A. Peeso's Crown and Bridge Work.

(5) Bradley Stoughton, "Metallurgy of Iron and Steel."

clean, sharp castings are to be made. Additions of the No. 68 solder lowers the melting point to 1945 degrees F., the same as pure gold, and the one part of zinc acts as a flux and makes a smoother casting alloy. [5]"This property of some of the lower-fusing metals to act as fluxes and deoxidizers, is utilized by sheet and iron founders, who often add a very small percentage of aluminum to their molten metal just before pouring, claiming that the metal so treated stays in a pourable condition much longer."

Casting gold "E" can be cast perfectly in a *cold* mold, the resulting casting having sharp edges and remarkable freedom from flaws and pits. It is very strong and tough, possesses spring and resiliency and best of all, *holds* that spring under use and under soldering conditions. It appears practically immune to temperatures below the melting point of pure gold. Other alloys tried were disappointing in this respect, as they either became extremely brittle under soldering heat or else softened considerably and lost their desired elasticity. In color it is a yellowish gray, hardly distinguishable from platinum, and its texture being very dense, it takes and holds a fine polish and like platinum, is unaffected by oral fluids. It will bend to a limited degree, but is not meant to be bent like other clasp metals.

FORMULA

Gold	65.0	
Silver	4.0	
Copper	9.0	
Platinum	8.5	
Palladium	12.5	21
Zinc	1.0	
	100.00	

After casting, the clasps are freed from all adhering investment, boiled in acid bath and all nodules and rough edges smoothed off. The clasps are then sprung onto the model teeth and we are ready for the next step. I have used the Ash tube teeth in most of my cases, so I will describe their use. I prefer them because they enable me to use a maximum amount of porcelain with a minimum weight of gold framework, and when ground for correct shape and occlusion, they can be beautifully repolished. The Goslee teeth or the Davis crowns for metal work can be used to good advantage.

The middle section, comprising the saddle, cup for porcelain and post, is then cast. Usually I prefer to use for a post a piece of high-fusing clasp metal wire of No. 14 gauge (B. & S.), picked up in the casting and afterwards made doubly secure with a bit of solder. This middle section is cast with Ney's casting gold "B," the only variation in technic being that the casting is made in a hot flask, as by so doing a better union between the cast gold and the post or posts is more likely to result. After cleaning and pickling, this middle section is placed in

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(5) Bradley Stoughton, "Metallurgy of Iron and Steel."

proper relation to the clasps on the model, plaster relations of the parts taken and the three parts assembled with one soldering. If the clasps are as accurately fitted as they should be, any very slight change during the soldering will disturb the relations of the three sections so that the bridge will not go to place on the model and the resulting appliance will not prove satisfactory. When the framework is found to fit the model as desired, the porcelain tooth is cemented to place and all metal work nicely smoothed and polished. Then final adjustments for occlusion are made, the ground surfaces of the porcelain polished and the bridge is ready for the patient. As stated before, if proper care and attention have been paid to every step, the bridge should require but little adjusting at the chair.

This technic will not appeal to the man who wants "hurry-up" results, or who expects that this form of bridge, although simple, can be constructed for a *small* fee. A careful tabulation of working time required in an average case shows one hour of chair time to get data and adjust bridge, with instructions to patient as to care of same, and from six and one-half to eight hours' laboratory time required. It will, however, appeal to any patient who has lost teeth through the failure of fixed bridge work, or who has sat for hours in a dentist's chair having his teeth and roots prepared for other forms of either fixed or removable bridge work. And in this era of strenuous war times, the patient's time is a factor demanding some consideration.

ADVANTAGES AND DISADVANTAGES OF THIS METHOD

First: No devitalization. We are living in an age of *prevention* and any method conserving the vitality of the teeth is worthy of consideration. We need no more deliberately devitalize two perfectly sound teeth as often has been done in the past, just to supply one missing tooth.

Second: No excessive grinding and mutilation of tooth surfaces, which often results in death of the pulp.

Third: An appliance that is simple for the patient to clean and care for, can easily be removed by the patient, boiled if necessary, and has no troublesome tubes, slots or sockets to be kept cleaned out as in other types of removable bridges.

Fourth: Will stay in position *under service*, and is rugged and dependable under most severe conditions.

Fifth: Can be constructed with a minimum of nervous strain to the patient and dentist. As but two appointments are required, the dentist's operating time is greatly conserved.

Sixth: Is almost universal in application where indicated—that is, for posterior teeth, where there is a sound abutment at either end of the space.

Seventh: Is easy to repair should breakage occur.

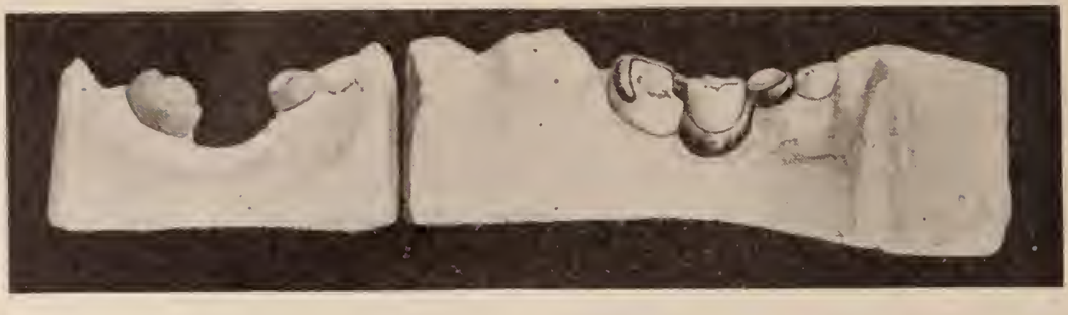

Fig. 12.—Another type of leaning-molar case; lingual views.

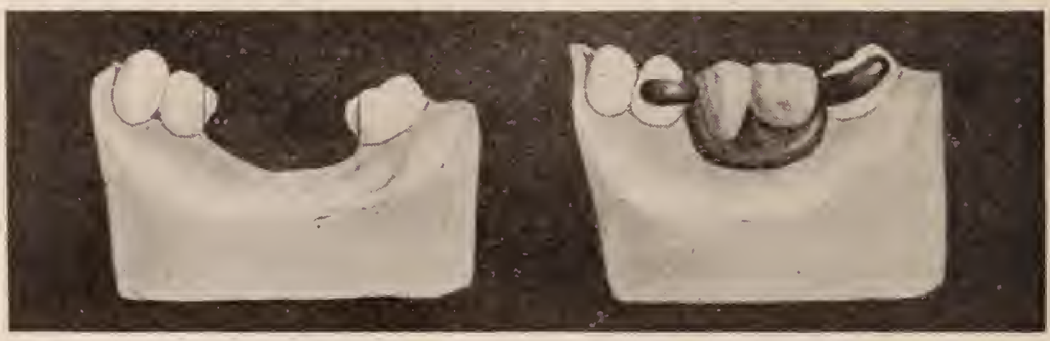

Fig. 13.—A two-tooth supply with leaning abutments. Can be used for chewing all foods; sticky or otherwise.

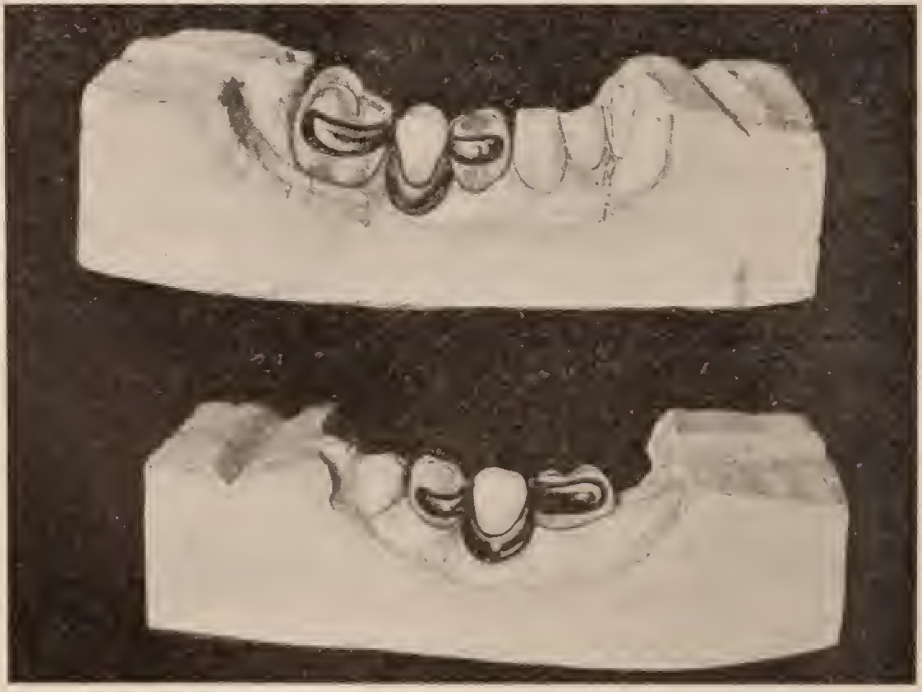

Fig. 14.—Right and left sides of one tooth supplies in same mouth.

Eighth: Can be constructed by any dentist with a good working knowledge of gold casting and soldering operations, who can construct a *well-made* fixed bridge; but cannot be "made to go" if carelessly constructed by the type of operator who cannot make a good fixed bridge, but who "gets away" with it because it can be jammed on with cement—and cement hides a multitude of sins—or did hide them until the radiograph came snooping along.

DISADVANTAGES

The disadvantages come under three heads:

First, and most important, is the liability of injury to the enamel surfaces under the clasps. We should select out cases for this appliance with great care, and not blind ourselves or our patients to the fact, long ago pointed out by Dr. Bonwill, that dissolution of the enamel and caries of the dentin will take place under this or any other type of clasp unless strict attention to cleanliness is observed. The fact that this kind of clasp does not allow room for any appreciable amount of food debris to crowd between it and the enamel should not lure us into a false sense of security when it is used on teeth of soft and chalky structure, or where the toilet of the mouth is neglected. I believe that with proper care and watchfulness on the dentist's and patient's part, time will show that no great amount of damage will occur under the clasps. And granting that it does occur, can it not easily be repaired with the many means that we have at our disposal? Surely such small damage that will come will be of less moment than the serious results that are coming from devitalized teeth, and of the two evils I am prone to choose the lesser.

Second: The second disadvantage is that which applies to all forms of removable bridge work, namely, absolute accuracy at every stage of the process. The success of the entire structure hinges upon the taking of a correct plaster impression to start with, and strange as it may seem, that has been the hardest thing to teach the practitioners desiring to learn this method.

Third. The third disadvantage also can be said to apply to other forms of removable bridge work, but possibly more so in the case of the clasp type. I refer to the liability of a patient swallowing one of the appliances. It is fairly easy to let one slip while removing or inserting it. I have not been unfortunate enough to have this accident occur to any of mine as yet, and caution patients to be careful—nevertheless it is an accident to be feared as the results might be serious.

It would not be proper to dismiss this subject without a word as to the instruction to the patient as to the care of the bridge and abutment teeth. These bridges, when fitted properly, are so comfortable that cases have been reported to me by dentists where their patients had neglected to remove the appliance for cleaning for two weeks at a time. I consider this the fault of the dentist and not the patient, although some patients are proverbially lazy in this respect. My patients are told very plainly that the penalty of any neglect in the care of teeth under the clasps will be carious teeth. They are also instructed in the care of clasps. Thus far, after a period of nearly four years, we are not seeing the rapid decay that some of the "wise ones" promised when I began my first experiments.

125 Marlborough street.

FRACTURES AND DISLOCATIONS OF THE JAWS*

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SUBJECTIVE SYMPTOMS

Pain and Tenderness—Spontaneous pain when the parts are at rest, particularly when there is little or no displacement of the parts, is slight, and not distinctly limited to the parts involved. It may be a referred or a reflected pain. In fracture of the jaws it usually is felt in any area supplied by any one of the three divisions of the fifth nerve (*Fig. 16*). The patient complains more of pains over the upper anterior part of the head rather than at the seat of fracture. The phenomena of reflected pain is thought to be due to certain nerve cells in the Gasserian ganglion having portions of their nerve fibers running in one or more divisions of the fifth nerve; thus the source of irritation may be in one division of the nerve and the seat of pain may be in one of the other divisions, the brain being unable to correctly interpret the source of irritation.

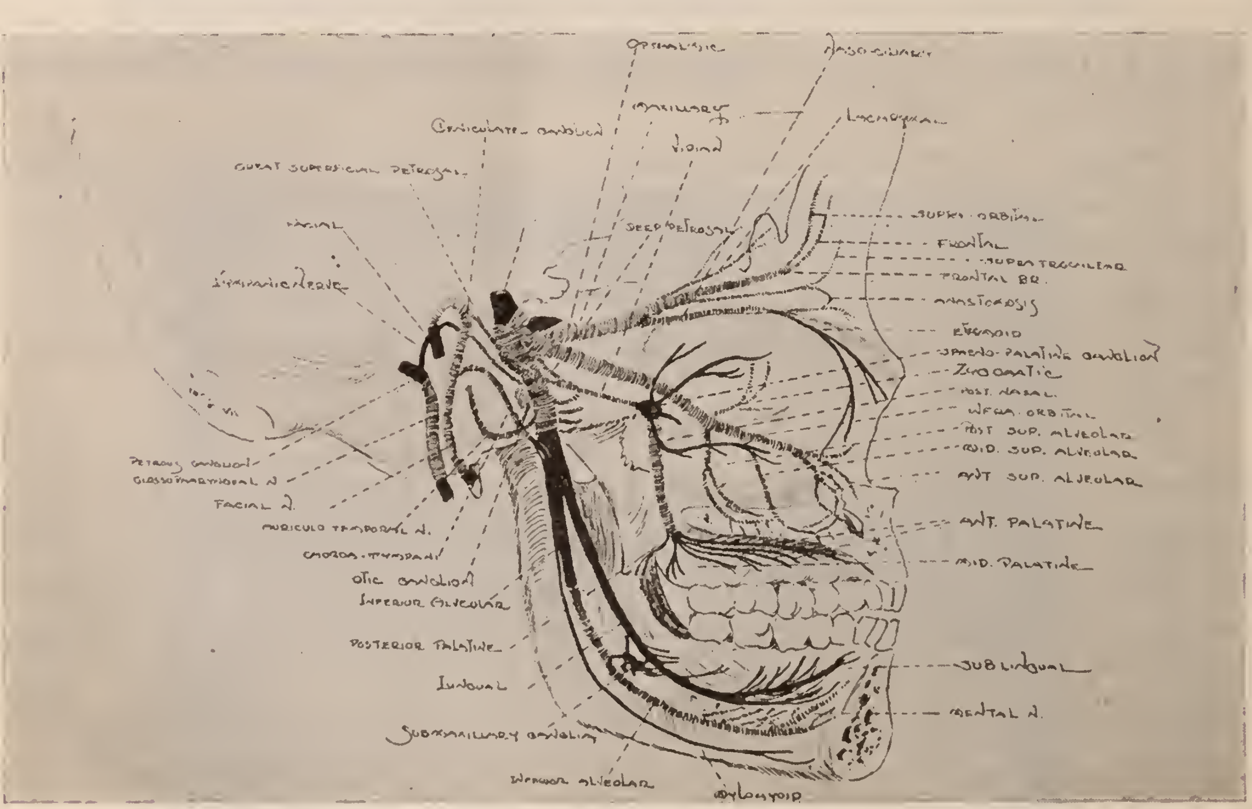

Fig. 16

Localized pain upon palpation or in movements of the jaw is a valuable symptom. The localized pain is best elicited by gentle palpation with the tips of the fingers along the line of the supposed fracture, and when the point of fracture is reached greater pain usually will be expressed by the patient.

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Spontaneous pain usually will subside shortly after the accident, and pain as a diagnostic symptom only can be determined by the methods stated above. Indeed, if there is little or no displacement of the fragments, the knowledge of a fracture will not be present to the patient, and several weeks may intervene before the patient will observe a tenderness, and it may be mistaken for the tenderness due to the contusion of the parts.

Pain as a diagnostic symptom in pathological or spontaneous fracture often may be misleading. When there is a marked displacement of the parts pain usually is very severe, on account of the abnormal position of the sensory nerves supplying the parts. (*Fig. 17.*) Pain and tenderness under these conditions is a constant accompaniment of fracture.

Loss of Function—This is a common result of fracture of the jaws, especially when the fracture occurs in such a locality that muscular tension causes displacement. However, the surgeon should not forget that certain traumatic injuries in and about the jaws will produce a disturbance in the normal functionating of the jaws. As an example, fracture produced in the removal of an impacted tooth may cause little or no displacement and trismus may result, and the operator may confuse the loss of function with the trauma instead of with the fracture.

History—This is a very important part of the procedure in determining the extent and character of the injury. The nature of the accident and the manner in which the force was applied, the interference immediately or later of function, and occasionally the patient's knowledge of a snap heard or felt at the time the bone was broken, is indispensable knowledge which the surgeon should have in determining correct diagnosis. These are not all present in every case, and the history should form only a link in the chain of evidence which makes up the diagnosis. In some cases the character of the injury is so apparent that it can be recognized at a glance; in others it may be so obscure that the most experienced observer may be in doubt, and all of the means of making a diagnosis must be resorted to.

DIAGNOSIS

This subject has been treated to a considerable extent under the head of signs and symptoms of fracture, so that there will be little to add concerning these methods of making a diagnosis. The examination of the patient should be conducted systematically with the view to learning not merely the existence of the fracture but also such details and complications as may be present and may affect the treatment and prognosis; and it should include an examination of the condition of such vessels, nerves, etc., as may have been injured at the time of the examination in order that such injuries, if their later consequences should become manifest, may not be attributed to the treatment.

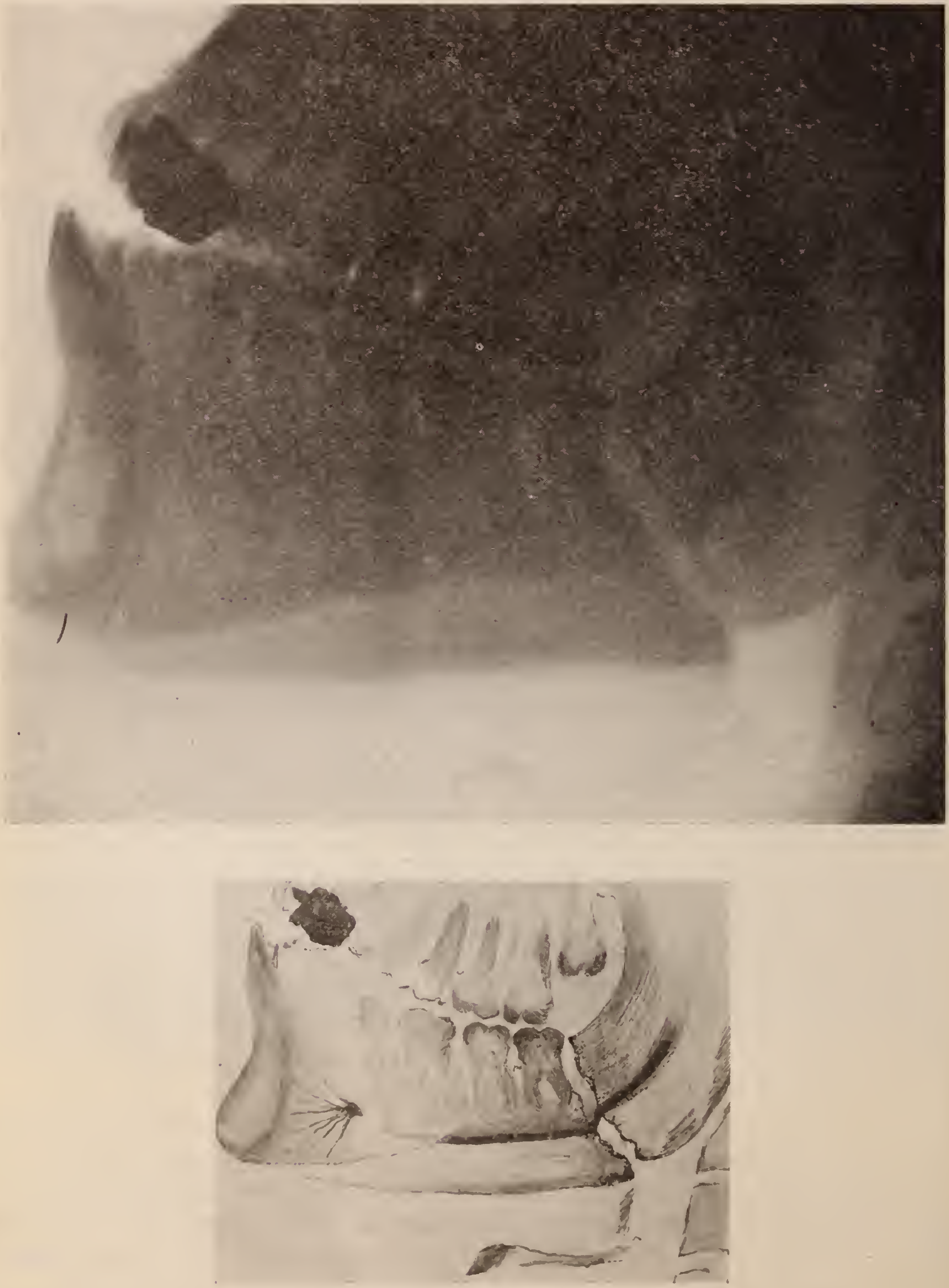

Fig. 17

If there is an extensive injury with great amount of swelling, a general anesthesia may be resorted to, to ascertain the exact conditions that are present.

THE X-RAY IN DIAGNOSIS AND TREATMENT OF FRACTURE OF THE JAWS

Thus far nothing has been said relative to the use of the X-ray in diagnostic work in connection with fracture of the jaws. We deem the subject of sufficient importance in this work to elaborate upon it to quite an extent. Dr. James G. Van Zwaluwenburg, professor of Roentgenology in the medical school in the University of Michigan, who has collaborated with me in the diagnosis and treatment of fracture of the jaws in the University Hospital, at my suggestion kindly consented to summarize this part of the subject:

"While the diagnosis of fracture of the lower jaw usually can be made without difficulty on the clinical evidence alone, the satisfactory treatment requires a knowledge of the exact relationship of the fragments, the presence of extra fragments, the relationship to the teeth and the tooth sockets, and the viability of the teeth, which only can be obtained by satisfactory X-ray examination.

"This is best done by means of stereographic plates or films. Elsewhere in the body it usually is possible to radiograph a fracture along axis at right angles, and thus determine with a fair degree of accuracy the direction and the magnitude of the displacement of the fragments. In the case of the jaw, however, anatomic conditions make this almost impossible. But the sense of the third dimension, of depth, is satisfactorily provided by making a plate for each eye and then by means of mirrors or prisms, observing the two images simultaneously. With proper attention to details it is possible to view the parts radiographically in exactly the same position and in the same scale as they lay when the exposure was made. The advantages of this method are obvious.

"Fractures of the jaw may be examined either by plates (extraoral), or by films (intraoral). A greater area can be shown and the conditions for stereoscopy can be controlled better with plates than with films, and therefore, a better idea of the exact relationships is obtained; on the other hand, the danger of obscuring the pathology by the superposition of the shadows of the opposite jaw and its teeth requires more careful attention to the position. Films, intraorally, also may be made in stereo, but pain and swelling usually prohibit the use of films in fractures; and, at best, it is impossible to demonstrate the entire width of the jaw without grossly distorting the projected shadows. For these reasons the plate method will be found the more generally useful.

"Stereographic plates may be made in any plane, and the requirements are absurdly simple. It requires, in principle: (a) that the two plates occupy exactly the same position with respect to the subject; (b) that the position of the tube is shifted the interpupillary distance of the observer; (c) the direction of movement of the plate must be parallel to one edge of the plate, and (d), the subject must be immobilized.

"In practice, the injured part is placed on a shallow wooden box with open edge containing the plate, the head is fixed by a weighted strip of cotton, the tube is placed in the selected position, and the plate and its holder rotated until one edge is parallel to the selected direction of tube-shift. After the first exposure the plate can be exchanged and the tube shifted without in any way disturbing the patient. As a general rule the direction of tube displacement is so chosen as to lie at right angles to the principal lines of the image.

"Any obliquity of projection may be reproduced by a corresponding obliquity in the position of the plates when in the stereoscope, and an undistorted picture may be studied. If the space relations existing at the time of exposure are faithfully reproduced, the image will be seen undistorted and in the actual size and depth of the original.

"A small diaphragm and a medium hard tube are required. The immobilization of the patient is the most important factor in the production of sharp definition. The slight tremor and the nutation with every pulse beat, while imperceptible to the eye, invariably result in a degradation of the definition of the radiogram unless prevented by suitable straps or bands. The patient's comfort also is of prime importance, since a microscopic tremor cannot be avoided in a strained and uncomfortable posture.

"By making two tube-shifts, first parallel to one edge of the plate and then at right angles or parallel to the other edge of the plate, we may expose three plates providing two stereograms, the second plate being common to both stereo sets. Although usually unnecessary, this procedure may give valuable information.

"The lower jaw may be studied in two projections, the posteroanterior (transcervical), and the lateral. The transcervical is useful only in fractures in the region of the incisors, and the image usually is badly confused by the superimposed shadows of the cervical vertebræ. The lateral position is much to be preferred. Projection should be from a point below and slightly posterior to the angle of the sound jaw and the head well extended. In this way the entire body and ramus of the injured jaw usually may be thrown in the clear of all confusing shadows. The temporomandibular articulation requires good markmanship for satisfactory demonstration.

"The interpretation of the plates usually is obvious. The fracture plane in the jaw usually is transverse and in the line of projection. Displacements of the fragments, the presence of multiple fragments, foreign bodies and the teeth involved, are noted without difficulty. Secondary changes due to infection, normal healing processes, or necrosis are seen only after the lapse of sufficient time to allow of demonstrable changes in the lime content of the bone.

"The reparative processes are essentially of two kinds, osteoclastic and osteoplastic. In point of time the former precedes the latter and in the absence of infection is not very marked. Under the influence of pyogenic organism, osteoclasis becomes excessive in degree and irregular in distribution, and the osteoplastic changes are similarly increased, frequently at a considerable distance, and especially along the periosteum. When a fragment is completely separated from its blood supply, osteoclasis fails from death of the osteoclastic cells and such a sequestrum retains its normal density in a field of reduced density, giving the impression of an increased density by contrast. In course of time it suffers some loss of lime salts by attack from the periphery by the cells of the tissue exudate, but at a considerably slower rate than the vital tissues about it. These effects are more marked and more prompt in the presence of an infection.

"Some care is necessary to differentiate between a sequestrum and the increased density caused by the over-riding of an oblique fracture, a problem that usually is obviated by stereographic plates, since the exact relationships are obvious in all cases.

"Opaque foreign bodies are most easily localized by stereographic study, introducing some opaque marker to serve as a point of reference. Fine cross wires applied to the outside of the cheek with adhesive serve very well for this purpose.

"Pathological fracture of the lower jaw from a primary destructive process is uncommon. It is a legitimate subject for X-ray study. Not only may the fracture be demonstrated but the nature of the primary disease may be demonstrated with a high degree of certainty. Osteomyelitis, tuberculosis, malignant growths, dentigerous cysts and phosphorus necrosis all are well demonstrated and usually quite easily recognized.

"The adequate demonstration of fractures of the upper jaw is a matter of some difficulty. Whereas the lower jaw is one of the densest of the bones of the body, the upper jaw, made up of thin bony plates, casts a comparatively feeble shadow, and in addition is so placed that it is difficult to escape the confusing shadows of the neighboring structure. It depends for its strength on its cellular structure. As a result its thin walls form a series of surfaces no two of which are in the same plane, and no position can be selected that will insure a projection in the plane of a possible fracture. Fortunately, the upper jaw is much less liable to injury and the diagnosis of fracture is fairly easily made on the clinical evidence.

"Three distinct principles may be followed in the study of this portion of the face: (a) by intraoral radiography; (b) by tangential projection, and (c), by direct transradiation.

"The intraoral method by the use of dental films usually is feasible in fractures of the upper jaw, but it is open to the objection that only a small field can be studied on each film and the correlation of many films is often a matter of some difficulty. In addition, the projection is necessarily rather oblique and the superposition of shadows may be disconcerting.

"The tangential projection aims to demonstrate the depression of a fragment below the level of its surroundings, and its greater distance from the surface of the face than one would expect. This is done easily. Unfortunately, it rarely tells the student anything more, anything of the size or number of the fragments or of the possible complications, for fracture of the upper jaw almost invariably is associated with injuries of and hemorrhage into the antrum of Highmore, and more or less extensive damage to the palate. Neither of these can be demonstrated satisfactorily by the preceding methods.

"In a direct transverse projection, two positions are available, the lateral and the postero-anterior, and study is much simplified by the use of the stereogram. All the arguments advanced in a preceding paragraph in favor of this method of study apply here with even greater force. In fact, the interpretation of the single plate (giving a flat image), is exceedingly difficult except in the hands of an expert, but the employment of the binocular image serves to reduce the confusion to a minimum. Even so the difficulty of recognizing a fracture in the absence of marked displacement is no mean one. For this reason it is the practice in this hospital to make stereograms in both positions at one sitting, rather than to run the risk of having to ask the patient to return for further study.

"The lateral stereogram especially is valuable to demonstrate the displacement of fragments in the region of the molars, the presence of foreign bodies and the involvement of other structures on the lateral aspect of the face. The postero-anterior, on the other hand, tells us more of the extent of the damage to the incisor regions and the upper portions of the face, besides giving us a complete view of the accessory sinuses, the palate and the nose.

"Except for the hemorrhage into the antrum and the danger of its infection, complications are rare. Small fragments, although entirely separated from the rest of the bone, rarely necrose but retain their vitality by virtue of their connections to the rich blood supply of the submucosal layers of the antrum (periosteal). Callus formation never is seen, and the presumption is that, in common with all other bones of membranous origin, healing is by fibrous union."

(*To be continued.*)

REINFORCED SILICATE CEMENT FILLING

BY EDWARD EVERETT HAVERSTICK, ST. LOUIS, MO.

The reinforced silicate cement filling was illustrated by models at a clinic by the writer at the St. Louis Dental Society's Golden Anniversary Clinic, in November, 1916, and again in Iowa City, at the twelfth meeting of the Alumni Association in March, 1917, and since that time there have been a number of inquiries about it; consequently, it might be well to tell something of this kind of a filling.

Dentists have all welcomed the silicate filling with a great deal of satisfaction, and it is being used more and more. However, it is never introduced without a feeling of uncertainty on the part of the dentist. Everyone knows that it is not as good a filling as a foil gold filling. Still it has the great advantage of being more esthetic and being easier to insert, and now very few dentists think of building large contour fillings with cohesive gold. The large gold inlays with silicate fronts and "peep-hole backs" for the incisal angles of teeth, are losing favor, as well they should. So that the future favorite filling for certain selected anterior cavities will be the filling made by grinding a piece of porcelain of proper shade to match the tooth to be filled and then setting the porcelain with silicate cement.

The piece of porcelain need not be ground so accurately as to fit the cavity perfectly, as the silicate will fill the inequalities and give a harmonious appearance. The porcelain, however, should be large enough to give the tooth its general contour and should make a perfect contact point with the approximal tooth, and should form an occlusion with the opposing teeth when the jaw is closed. The porcelain should be of sufficient size to reproduce the general contour of the tooth so that it will not be necessary for the silicate cement to run over the edges of the porcelain any more than you would let thin flakes of silicate run over the margins of a cavity when you have finished it, for the simple reason that the thin edges will break off later.

This kind of a filling has many advantages. In the first place, it overcomes nearly all the weak points of the silicate filling, which points might be mentioned as lack of strength to retain the contact point, and insufficient strength to hold on incisal angles or occlusal surfaces.

On first consideration it might seem a hard task to grind a piece of porcelain to fit a cavity and it might be thought that dentistry is going back to the time when porcelain inlays were ground from porcelain bars, but that is not the case. The inlays are cut from the part of a porcelain tooth which corresponds to the part to be replaced. A broken tooth or a diatoric tooth, or any pieces of a tooth, may be used so that a piece is obtained that approximately corresponds to the cavity you wish to fill. For instance, as an example, if you wish to replace the mesio-incisal angle of a superior central incisor, that corresponding portion is split off a porcelain tooth (when the destruction is great a detached-post crown is best) and then it is ground to approximately fit the cavity. A groove cut by a knife-edge stone on each side of a porcelain tooth and a clip with a pair of wire-cutting pliers is a quick way to roughly shape the piece of porcelain for an inlay. I might add that the principle involved, as far as the shape of the porcelain is concerned, for its retention, is similar to that of a gold inlay for its retention.

It might appear to you that the procedure would take a great deal of time, but it can be done many times as quickly as a gold inlay can be adjusted to a cavity and polished after it has been cast.

The writer would like to encourage you to try this method for certain selected cavities where you wish something better than a silicate filling. You will be surprised how little retention is necessary to hold a piece of porcelain in a tooth, but it is well to have all the retention you can easily obtain, so some portion of the porcelain should extend into the cavity deeper than the margins.

Boyle and Maryland Ave.

> The question is not, Will men honor you for your work? but, Does your work honor you? Your concern is not only to create profits for yourself but to make that which will profit many besides yourself.
>
> —OZORA S. DAVIS

IMPORTANCE OF X-RAY DIAGNOSIS IN DENTISTRY*

BY ALONZO MILTON NODINE, D.D.S., NEW YORK, N. Y.

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EACH YEAR sees the value of good dentistry increasingly appreciated. More and more the public is asking for and expecting better dental service.

The importance of the dentist in health conservation is now generally recognized. Physicians and surgeons, more than ever before, are seeking the co-operation of the dentist in their efforts to discover and to cure causes of physical ailments. The dentist is having placed upon his shoulders a great and grave responsibility. And this responsibility cannot be ignored or shifted. He must be able to help discover the hidden causes of disease, often located in the jaws, and eradicate them. He must so perform dental operations that they will not become underminers of his patients' health.

In the light of our present knowledge of the influence exerted by septic mouths, septic teeth and septic artificial substitutes in the cause of systemic disease, it is as impossible for a conscientious, educated dentist to practice his profession without the use of the X-ray as without the use of a sterilizer. The more skillful and the more careful the dentist, the more keenly he recognizes the necessity for and the value of the X-ray. The dental surgeon is no longer concerned solely with the repair, the treatment and the replacement of teeth. He is concerned more seriously with his patients' health and life.

Evidence accumulates with increasing rapidity that abscesses on the ends of devitalized teeth play a most important part in the cause of many cases of endocarditis, rheumatism, neuritis, nephritis, gastric ulcer, appendicitis and other diseases. And it is only by the extensive and systematic diagnosis with the X-ray that these abscesses are discovered. Experience brings out the startling and almost unbelievable fact that about ninety per cent. of the devitalized teeth have either incomplete or no root fillings. Fully seventy-five per cent. of these show destruction of bone and infection around the apical ends of roots. All such cases may be demonstrated by the X-ray.

While the X-ray is of utmost value in discovering these foci of infection, it has a still greater value when employed for the purpose of making the complete filling of most of such roots possible and certain.

The employment of the X-ray removes diagnosis and treatment of dental diseases and conditions associated with them from the realm of guess-work and doubt to that of comparative positiveness and certainty. The X-ray clearly demonstrates that surgical operations on the teeth must be performed in a surgical manner. When so done and checked up by the X-ray, they may enjoy an immunity and permanency hitherto impossible to attain.

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*A lecture delivered before the Golden Jubilee meeting of the Tennessee State Dental Association, Memphis, June, 1917.

The orthodontist, the prosthodontist, the exodontist, the oral surgeon and general practitioner each find the X-ray of peculiar and positive value in the diagnosing and treatment of the special conditions which may come under his care. In co-operation with the physician he may employ the X-ray and interpret its findings with knowledge and skill that the physician rarely possesses. The X-ray not only saves the patient time and money, but what is of supreme importance, it may save his health, which is priceless. Its use establishes in the patient's mind a feeling of security and confidence. The dentist finds in its employment an interest, a satisfaction and a security that makes possible, so far as it is within the range of his special knowledge and training, his assuming the great and grave responsibility of protecting and preserving the health of his patients.

In these general terms a fair estimate of the value of the X-ray in dentistry may be described. What the searchlight and chart are to the navigator of a ship, the X-ray and radiograph are to the dentist. That captains sail into difficult and dangerous harbors in foggy and uncertain weather without the searchlight and chart is true. That they would continue to do so without them is equally true. That dentistry was practiced and was practiced well before the X-ray is also true. That it is and perhaps would be practiced well were the X-ray never used, is also true; but there would be as much difference between a captain entering a dangerous harbor without a chart and searchlight at night with a valuable cargo as a dentist trying to diagnose and operate upon an obscure and uncertain case without the X-ray.

Yet to point out what is the greatest thing the X-ray has done for dentistry is difficult for me to do with any degree of confidence or satisfaction to myself. Nevertheless it may be declared most positively that the X-ray has reformed and revolutionized dental practice. One thought comes to me with persistent insistance: The X-ray has made us practice better dentistry. The X-ray has done away, to a large extent, with "I'll do the best I can; then take a chance." Now, the X-ray not only convinces us that the chances that I and others took were disastrous, but it shows us something still better—we can eliminate the necessity and the temptation to take the chances which we formerly took. When we didn't use the X-ray, if we broke off a piece of root in extracting a tooth, we took a chance—left it in and expected it to work out. Now we don't take that chance, because too many radiographs bear witness to the fact that a piece of root left in is a dangerous practice.

When we did not use the X-ray, if we could not fill a root canal to the end, we took a chance and filled it as far as possible, and then took another chance that it would not cause any trouble. Now, because we use the X-ray, we can fill more roots to the apex, and those we cannot fill we either extract the tooth or resect the root.

When we did not use the X-ray and certain teeth were missing or unerupted, we took two chances; one that they were not there and one that they were. In either case we took a chance of trouble. We might perform a useless operation or we might neglect to perform a necessary operation.

How many of us have spent a great deal of time looking for root canals that existed only in our imagination, and how many times we did not fill root canals because we did not know they were there. But the time uselessly expended and the potential sources of trouble we left unattended could have been done away with by the employment of the X-ray.

In the field of oral surgery we find the wrecks and wreckage of careless, unsanitary, septic and sometimes almost criminal dentistry. I find that almost seventy-five per cent. of the oral surgery I do is the result of bad dentistry. When patients come to the oral surgeon, the Court of Last Appeal, to save their health and perhaps their lives, imagine the responsibility when perhaps the skilled efforts of all others of the healing art have given no relief! Imagine the carnage that would ensue did the oral surgeon not first have radiographs of the teeth and jaws, charts and surveys of these organs!

It would seem almost impossible for oral surgery to have reached the high standard of excellence it now has attained if the use of the X-ray had been denied it. The limitless conditions in which radiographs serve the oral surgeon are too numerous to mention.

Because of the use of the X-ray, oral surgery may answer that question so frequently asked, "What are we going to do with those teeth whose root canals we cannot fill?" Oral surgery tells us to fill those canals as far as possible and then resect the roots. If this cannot be done, then better extract the tooth.

Oral surgery also answers that other question asked, "What are we going to do with those teeth which we cannot cure of a chronic apical abscess?" Disinfect and fill the root canals, and oral surgery will cut out the granuloma and resect the septic, eroded root end.

But only by the frequent and consistent employment of the X-ray is it possible for the oral surgeon to know how far the canal is filled and the extent of the apical infection.

THE RADIOGRAPH IN PYORRHEA ALVEOLARIS

The use of the X-ray as a means of diagnosis in cases of pyorrhea alveolaris is quite as essential, quite as valuable as in any other field of dentistry. That the X-ray is not more generally used by those who are making the treatment of this disease their special work is to be deplored. Did specialists realize and appreciate the vast amount of doubt, disappointment, dissatisfaction, mistrust and wasted effort for which the failure to employ the X-ray is responsible, they would not have that unfounded faith, which they now have, in their unassisted visual and digital examinations.

As a form of treatment, the X-ray has doubtful, if any, value. The modes of application to any part of the mouth, except to the incisors and canines, is fraught with such difficulties as to be impracticable were it desirable to use them. The element of danger in the continued treatment with the X-ray also precludes their employment for the treatment of this disease. Taking everything into consideration the chief and perhaps the only value the X-rays have in the field of the Riggs' disease specialists is the taking of the X-ray for diagnostic, record and research purposes.

That the X-ray is an infallible guide is an idea that must not be entertained for a minute; but all symptoms, signs and hints taken in conjunction with the radiograph examination will become more clear and the diagnosis more positive by its use.

The most apparent use to which the X-ray may be applied is to find out the amount of bone destruction or absorption about the roots of the teeth afflicted with Riggs' disease. Instrumental examinations are about as exact and certain as the complete filling of root canals without the radiograph. How certain that is may be judged from the fact that less than five per cent. of the root-canal fillings reach the apex.

The radiograph will show not only the amount of absorption of the alveolar bone, but will, within certain limits, show the state of attachment between the alveolar bone and the tooth. It also will show the length of the root and the amount of leverage it may stand.

How great a help this is may be understood very well by those who have treated cases of Riggs' disease, believing, from examination without the X-ray, that there was sufficient alveolar bone about the tooth to justify its retention, or that the tooth was sufficiently long or strong to withstand the leverage, or that the attachment between the bone and the tooth was sufficiently secure to yield to treatment; then, after the most expert instrumentation and medication, the teeth came out within a short time.

The most common mistake made by those who treat Rigg's disease without using the radiograph is that of treating alveolar abscesses for Riggs' disease. The number of cases in which chronic alveolar abscesses discharge their pathological contents between the approximal surface of teeth is exceedingly great. And this simulates Rigg's disease so closely that it is a continual puzzle to those who treat this disease why such teeth fail to respond to treatment. This condition of affairs is not confined to the anterior teeth or bicuspids, but includes also the upper and lower molars.

The presence of undiscovered blind abscesses is also another condition that confuses both the diagnosis and the treatment of Riggs' disease. Such teeth having lowered both the systemic and local resistance, the efforts of the dentist to restore normal tooth function and overcome the general infection, supposedly due solely to the Riggs' disease, are defeated and nullified by the constant and insidious infection produced by these apical abscesses. This suggests that any teeth to which are attached caps, crowns or bridge work, or any devitalized teeth, should be subjected to radiographic examination prior to treatment.

The frequency with which teeth come out after prolonged treatment and supposed cure, the roots of which are absorbed or eroded, is another state of affairs that the radiograph largely would have foreseen. The wasted effort, the disappointment and dissatisfaction for which this is responsible is very great. Roots whose apices are as sharp as pins, roots which have been eroded or corroded, are left to continue in the mouth as a source of infection and irritation. They are beyond the hope of cure, and delay the restoration of healthy conditions about saveable teeth. Not a few teeth about which Riggs' disease is exerting its malignant influence have undergone the process of excementosis. The extent of this excementosis often is so great as to call for the extraction of the tooth or teeth. The difficulty of treatment and confusion that such an added pathological condition entails on the dentist makes this one of the most serious problems that confronts him.

Since the treatment of Riggs' disease resolves itself into a reorganization of the mouth, and an attempt to restore function to as nearly normal as possible, the employment of the radiograph will be found to be the most valuable and trustworthy guide we have to help attain this end. It is a continual surprise and wonder to those who now use this agent as a diagnostic help to find those unexpected and strange conditions which only the radiograph or autopsy would reveal.

Hundreds of radiographic examinations I have made force upon me the conviction that I and others who hitherto have not used the radiograph have been indulging in some very wild speculation and guess work. This has entailed a vast amount of not only useless effort but, in many cases, harmful effort.

When we review the great number of conditions that may produce chronic irritation and lay the foundation for Riggs' disease, it will be realized that a radiograph examination is of such value as to be almost indispensable for anywhere near a proper diagnosis.

At first thought one has such confidence in his ability to see with his eyes and feel with his fingers that the X-ray seems unnecessary.

But even the most expert fail to find, and often overlook that which the X-ray does find. The greater experience one has had with the X-ray the more convinced one becomes that one's ability to discover by any other means the conditions the radiograph reveals is greatly over-estimated.

It is only necessary to name some of the things which, in the treatment of Riggs' disease, have been overlooked by the eye and the instrument. For example, pieces of tooth-pick, gutta percha, amalgam and cement pushed up between teeth; broaches, bits of broken instruments, ligatures and rubber dam have been found. Perforated roots, with the post of a porcelain crown sticking out; lost or forgotten roots and impacted teeth causing chronic and persistent irritation, cysts and necrotic areas.

Often, with all conditions right, as the tube exposure and angle of the rays, it is possible to find deposits on the teeth and pulp-stones in the canals. It is quite advisable, if not necessary, to have a radiographic examination before beginning treatment as part of the diagnosis. It is also well after the treatment is completed to again examine with the X-ray as a matter of record. After a year or two it is quite interesting to again examine with the X-ray to find out if regeneration of the bone has taken place.

THE X-RAY MACHINE AND EQUIPMENT

Many of you will be purchasers of X-ray machines, and will be interested in all types and kinds of X-ray equipment, at prices ranging from $75 up. There are four types of X-ray machines on the market. The high-frequency machine or the suit-case type, costing from $75 to $250; the induction coil with an electrolytic interrupter, ranging in price from $250 to $500; the interrupterless or transformer, ranging in price from $275 for alternating current, to $1000 or more for direct current; and a newer type, a transformer with a Coolidge tube, costing about $500.

Many men will be tempted to buy one of the smaller, cheaper, suit-case type of machines, called the high-frequency. While the initial cost of these machines is lower than the other types, the X-ray tube itself deteriorates very quickly, and soon the cost of replacing the tube brings the price up to, or beyond, that of the other types. Again, others believe they will experiment with the smaller, apparently simpler and cheaper machine first, and they buy this better machine later.

Those who have bought this type of machine have, after a short experience, realized either its limitations, its failure to live up to expectations or the cost of upkeep. So my advice to those who contemplate buying an X-ray equipment is, buy either a good coil machine, an interrupterless, or transformer with a Coolidge tube.

For alternating current, which is the kind supplied almost everywhere except in the largest cities, the interrupterless type of machine is more efficient than the coil, everything else being equal. For about the same money, say $300, an interrupterless machine may be purchased, which is about twice as efficient as a coil machine (of the same price), on the alternating current. For direct current, the coil machine will be found quite efficient, costing about $300, but the interrupterless machine, which undoubtedly is more efficient, will cost about twice as much. Another advantage in buying an interrupterless machine for alternating current is the violet ray, or high-frequency attachment, which also goes with it. The advantage of buying a transformer with a Coolidge tube is tube trouble is done away with. Once the standard of exposure is established, the tube does not change and your results may be duplicated. Further, it is practically fool-proof. This type is made for direct and alternating currents.

To summarize my advice, which is gained from experience in the use of both types of machines on both currents—except for those who may use the X-ray when associated with a physician—those who intend, or do extensive radiography as a specialty, buy an interrupterless machine. I would also advise the purchase of two Tungsten target seven-inch X-ray tubes, separate tube stand with a lead glass tube shield, and a hard lead rubber hood, or buy a transformer with a Coolidge tube.

I will not go into the description of the production of X-rays, as this may better be found in some of the books I'll recommend.

After you have determined for you, or have gained the knowledge by experience, the proper vacuum of the tube and the proper exposure, before taking a radiograph, test your tube. That is, see if it meets the requirements that have been determined. The tube usually is in the right condition to take a radiograph when it shows that beautiful olive-green color and a distinct division in the tube between the active and inactive hemispheres. It is well to do this in the presence of the patient, without exposing the patient to the rays. This will accustom the patient to the cracking or snapping or whining of the tube and the machine.

Then seat the patient in your chair, with the head in an upright and comfortable position for almost any radiograph. Then focus your tube with the center of the rays on the apex of the tooth to be radiographed. Then have rays directed at right angles to a plane that will bisect the angle between tooth and film, and the Tungsten target twelve to sixteen inches away from the part radiographed.

In the lower jaw, because of the conformation of the jaw, it is possible to place the film parallel to the molars, and therefore the rays will be directed at right angles to the teeth. But in the upper jaw, because the alveolus slopes off into the palate, the rays must be directed so that they will be at right angles to a plane that will bisect the angle formed by the tooth and the film. Or, instead of the rays being directed at an angle of 90 degrees, the angle will be somewhere between 55 and 25 degrees; for the molars and bicuspids it will be about 50 degrees to 45 degrees; cuspids about 45 degrees to 40 degrees; and centrals and laterals 40 degrees to 25 degrees.

After having approximately adjusted the tube, flash it once or twice to acquaint the patient with the procedure, and then remove the film from the lead box, turn down the sharp corners and manipulate it a little so as to make it a little more flexible, place it in the patient's mouth, let us say for an upper molar. Have it placed so the red packet containing the film will come to about the occlusal surface of the tooth. With patient's thumb on the film and the other finger on the side of the cheek or temple for the upper jaw, again adjust your tube to any change in the position. Caution your patient not to move under any circumstance, and then give the required exposure.

Then remove the red waxed paper, which may become wet and soak into the black paper (which is not water-proof)and spoil the film. The film should then be placed in the lead box until you are ready to develop it.

A small, light-proof closet with a ruby light and a shelf may be used for developing and fixing your films; or, if you haven't a closet handy, a box may be bought or made, one side of which has light-proof sleeves. The top of the box may have a ruby-glass window, through which you may watch the progress of developing. The ruby light, if an electric bulb, may be inside; or outside if gas or candle. This light naturally will be at the back of the box. The box may be from eighteen inches to two feet wide, twelve to fourteen inches deep and about fourteen inches high. Develop your films until both sides look alike, or until, when held up to the red light, the light does not show through. The films, after fixing and after thorough washing, may be hung up to dry be means of pins, clamps, special film holders or a tray made by tacking cheese-cloth over a frame.

The X-ray negative may be described, for the sake of convenience, as a shadow picture. It sometimes has been called a skiagraph. It registers the different degrees of density or transparency of the structures through which the X-ray passes. Therefore, the denser substances or structures such as gold crowns, amalgam fillings and gutta percha, through which the rays pass obstruct the X-ray and affect the film but little or not at all. They show white or clear in the film. The tooth substance less dense or more transparent and shows a little darker or grayer; the bone still grayer or darker. The pulp chambers and root canals, if not filled or whether the pulp be vital, devitalized or removed, will show still darker or grayer. The soft tissues will, with a proper exposure, show up quite dark, and where there is no bone, it will be black or very dark gray.

In the prints taken from the negatives, and the prints seen in books, magazines and lantern slides, these shades are reversed. Where there is no bone the print will be white, the soft tissues slightly darker, the pulp canals and pulp chambers quite light, the bone a little darker, the tooth still darker, and the filling black, etc.

Suppose, for example, you have an upper molar with a cap on it, a second bicuspid with a large amalgam filling, and a first bicuspid with a porcelain crown on it. On the buccal side over these teeth the gum is puffed up and all these teeth are sore. Suppose this patient came down here from New York on a visit and you wanted to find out which tooth was the cause of the trouble. The quickest way out of your difficulty would be to take a radiograph or have some one in town take one for you. After developing, fixing and drying the radiograph, you look at it with a piece of frosted glass between the film and a strong light. The first two things that will attract your attention, perhaps, will be the light or white gold crown. And you see that it does not fit the tooth; it stands off like a skirt. Next you will look to see if the root canals are filled. Oh, yes, the palatal root canal is filled all right; that white line goes right to the apex. Then you will notice two other white lines. You'll look for the two buccal roots and discover that the root-canal fillings go less than half way up to the apex.

You know that any tooth whose root-canal fillings does not go to the apex is to be suspected; so you look at, let us say, the anterior buccal root, and right over the apex you see a little dark shadow like a cap, distinct, sharp and defined. Sometimes this little dark area fades off into the bone with no sharp outline. This is an apical infection, a blind apical abscess, and if sharp and defined, it is chronic and of long standing. The infection has gradually dissolved away the bone, so at that particular spot there is no bone and there is a distinct granuloma. But over the palatal root, dipping down, you will notice a faint, light, uniform line, and above the palatal root, in spite of its being filled, you'll notice a large dark area. "Must be a large abscess." Not at all. The line is the floor of the maxillary sinus, and the dark area is the maxillary sinus.

Now you will notice the second bicuspid. The large amalgam filling apparently extends into the pulp chamber. But you look for the canal filling and instead of a white line you find a dark line extending to the apex. The root canal is not filled at all but there is just a faint dark line around the apex which continues down the sides of the root; root canals unfilled, and no marked apical infections, but the amalgam apparently extending into the pulp chamber.

Now we'll look at the first bicuspid; we can see the post of the canal as a long white line and a little root-canal filling beyond that; but the balance of the palatal canal apparently unfilled. The buccal canal is not filled at all. Perhaps it looks as if it penetrated the side of the palatal root. The apical end of the palatal root seems enlarged and swollen, just as if someone had hit it on the head and it swelled up; but no dark line or dark space around this end of the root. Now, what is your diagnosis?

First, on the molar an apical infection, with a chronic blind abscess on the anterior buccal root, due to the fact that root canals are not filled properly. The crown also does not fit. It will be necessary for you to take off the crown, fill the two buccal root canals and either ionize or resect the anterior buccal root and make a new crown, as there is a large pocket between the second bicuspid and molar. The patient will lose this tooth if this is not done. It must also be done to prevent any systemic infection such as neuritis, rheumatism, heart disease, etc.

You test the second bicuspid with a hot instrument, or ethelchlorid, or violet ray, or galvanic current, and discover the tooth to be vital. Nevertheless, you may safely diagnose the case as a pulp congested from the close proximity of the large amalgam filling, and you advise the removal of the large amalgam filling, sterilizing the cavity and lining the cavity with cement. This may account for some of the pain.

The first bicuspid has an acute abscess, due to one root not being filled at all. The swollen appearance of the apical end indicates that, and perhaps a perforation of the root.

You can imagine your perplexity when confronted with a condition like this. Also, take into consideration the vast amount of information you have and the certainty with which you may point out these things to your patient.

In the upper jaw be careful not to mistake the maxillary sinus for an abscess cavity. Nor make the mistake of saying the root penetrates the floor of the maxillary sinus. Remember the floor of the sinus is uneven, often divided and dips down between the two walls. The penetration of the floor of the antrum by these roots is not common. In the anterior teeth between the centrals, don't mistake the incisive foramen for an apical abscess. This foramen is often quite diamond-shaped, and often oval in shape. Also, unless you take two radiographs at different angles, you may sometimes think the first bicuspid has but one root. It is also well to take two or three radiographs of the first upper molar.

In the lower jaw do not mistake the mental foramen for an apical abscess on the root of the bicuspid. Also, do not mistake a part of the inferior dental canal for an infected area. Also, unless the angle is quite right, don't be too sure that canals which are quite large, and the root-canal fillings apparently go to within a very short distance of the apex, are not filled to the apex. When the filling goes through you may be absolutely safe. Don't be too positive about finding pulp stones.

WHAT TO EXPECT AND WHAT NOT TO EXPECT FROM A RADIOGRAPH

A radiograph will not tell whether a tooth is vital or devitalized unless the root is filled, or there is an apical infection or apical abscess. Some root fillings are transparent to the radiograph and therefore appear unfilled. But even in such cases it has been found that filling materials of this character, most of them, anyway, are not good root-canal fillings, and it is advisable to replace them with something better, such as rosin and chloroform and gutta percha, or chloro-percha and gutta percha, pushing the chloro-percha through the apex.

Don't expect every radiograph to show whether a filling does or does not encroach upon the pulp. Sometimes the angle upon which it is taken will make it appear that it does and sometimes that it does not.

An X-ray will not show all apical infections. There may be apical infections in which the bone has not been destroyed. Do not expect the X-ray to show all fistulous tracts. Sometimes it will and sometimes it will not.

Unless two and sometimes three radiographs at different angles are taken, all the roots of the upper first or second molar will not be shown clearly. Unless two or more radiographs at different angles are taken, do not expect a radiograph to show whether or not a root is perforated.

Radiographs are supposed to show foreign bodies in the teeth and jaws, such as metal fillings, pieces of fillings, gutta percha, pieces of cement, broaches, missing or forgotten roots, misplaced or fractured teeth, cysts. When wires are placed in the root canals it will show how far the canal is accessible and the curvature of the root and the best means of access. Also, remember that chloro-percha and gutta percha are the best root fillings so far devised, because they may be pushed through the apical foramen without danger if aseptic precautions have been taken. Also they will show up clear and distinct in the radiograph.

DANGERS OF THE X-RAY

I frequently am asked by dentists what are the dangers attached to the use of the X-ray, either to themselves, to the assistant or to the patients. In answering these questions let me call your attention to some important facts. We know some of the experimenters, the early experimenters, with the X-ray have suffered from X-ray burns; have lost their hands, and some their lives. Why? Because they did not know, did not realize, that there was any danger to themselves from long and frequent exposure to the direct action of the X-ray. They understood little about its dermatological effects, or its sterilizing effects either on themselves or on their patients. Therefore, they neither protected themselves nor their patients from these effects until too late.

Electricity is a dangerous force. Therefore, in conducting it from its source of production to the place where we want to use it, we insulate it. We know that it is dangerous because experience has shown that if we pick up an exposed or uninsulated wire we get a shock, or if we forget to drop it before the current is turned off we may lose our life through the sheer inability to let go. Yet no one hesitates to use electricty for any purpose it can be used.

Steam is a dangerous form of energy, so dangerous that in conveying it from place to place it is encased in heavy iron or steel pipes. If we expose ourselves to steam for a sufficient time we will suffer and many have lost their lives from steam which has escaped its boundaries. We know the X-ray is dangerous to any one subjected to its influence—if precautions are not taken. But when these precautions are taken the X-ray is no more dangerous than the sunshine.

IN REGARD TO THE PATIENT

With the apparatus we now have, so far as the dental use of the X-ray is concerned, the patient is not in the slightest danger from its use. I cannot conceive of any patient suffering from exposure to the X-ray for the taking of radiographs, with short exposures that are now possible. I can conceive of a dentist exposing his patient carelessly over too long a time, with a very soft tube; or as I have known of a dentist lowering his tube for twenty or thirty seconds while his patient was directly exposed to the rays. Even this only resulted in a temporary loss of hair.

So far as the dentist and his assistant are concerned, there is absolutely no danger from the use of the X-ray for which there does not exist ample and simple protection. I know of no dentist or dentist's assistant who ever has operated an X-ray machine under the conditions I'll state, with the protection I'll name, who ever has suffered or ever has had impaired any function which nature gives us, in any way, in any degree or in any particular. Yet, if any dentist, knowing the dangers attached to the direct, continued and frequent exposure to the X-ray, fails to protect his assistant or himself, he certainly is doing his family a grave wrong—but what is still worse, he is doing a positive and perhaps irreparable injury to his assistant, who certainly must have confidence in him.

In the first place, in my personal experience I have exposed my hand to the direct X-rays less than twelve times in less than five years;

I should say about one or two minutes in five years. I have used the X-ray over five years and taken thousands of radiographs, and never have seen the slightest suggestion of any bad effect whatsoever.

WHAT PRECAUTIONS SHOULD WE EXERCISE?

First: Never expose your hand, or your assistant's hand, or any part of the body, to the direct action of the X-ray. (Any film or plate that the patient cannot hold, get someone else to hold.) One exposure of two to ten seconds never affected anyone. It is the repeated exposures at short intervals for a long time with weak rays that does the harm.

Second: Have the X-ray tube in a lead glass tube-shield with aluminum filter, and over the lead glass tube-shield have a lead rubber shield.

Third: Stand as far as possible away from and to the side of the X-ray tube.

Fourth: Use a machine with which you may make reasonably short exposures, from two to ten seconds.

Fifth: If you take on the average more than ten or fifteen radiographs a day, operate your X-ray machine behind a lead-lined shield, or in another room, lead lined.

No instrument or piece of apparatus that a dentist can buy will, for the outlay, be productive of so much good in all directions. The increasing interest that physicians and surgeons are showing in the septic conditions found in the mouth suggest the advisability of the dentist, for his own protection, to employ the X-ray more extensively than he hitherto has done.

Every man who uses the X-ray becomes a better dentist. He realizes, as never before, the possibilities of his profession. The X-ray not only shows where he and others failed in the past, but it is the most excellent guide to save him and others trouble in the future. The dentist, with the X-ray at his command, goes at his work with a confidence and certainty that he did not possess before. This state of mind and attitude is transmitted to a great extent to the patient.

At the expenditure of about ten to fifteen minutes, including the adjustment of the apparatus, exposure, developing and fixing, and less than ten cents' cost, including film developing and fixing solutions, information may be obtained that perhaps will save the patient's tooth, his health or life, and the dentist needless trouble, discouragement and perhaps failure. I feel that the man who employs the X-ray in his practice will be able to increase his fees considerably and at the same time give his patients better service, more scientific dentistry than the monetary increase would seem to indicate.

The man who uses the X-ray indulges in something that is not only profitable but intensely interesting and highly illuminating, and he will be able to undertake operations which were not attempted before with a confidence that makes for success. I am speaking out of my personal experience, and the experience of my friends who are using the X-ray. It is one of the best recommendations and the most convincing testimony of the further fact that good dentistry, that preventive dentistry, is the most economical dentistry in health and money, because the radiograph brings to the patient the realization as nothing else will that decay and disease follow with a remarkable presistency, neglect and indifference. It also furnishes substantial backing to the fact that health is priceless, that the preservation and conservation of the health of the mouth is of most vital importance in the restoration of this priceless assistant.

BOOKS AND ARTICLES TO READ FOR FURTHER STUDY

Would advise: "Prof. Satterlee's Dental Radiology," ($3.00); "Raper's Elementary and Dental Radiography," ($5.00); Dr. Kell's "Chapter on Radiography" in Johnson's "Text Book of Operative Dentistry;" "Sturridges' Electro-Dental Therapeutics," ($2.75). This last is an excellent book for anyone who has electric apparatus to have in his library, and I strongly recommend it, not only the chapters on radiographs but those on ionization and violet-rays. I also recommend the members to send for George M. Brady & Co.'s book, "The Paragon X-ray Book," 754 South Weston Ave., Chicago, Ill.

8 W. 40th St.

HOW TO GET RICH

J. Pierpont Morgan said the secret was to re-invest all dividends of stocks, bonds and partnership profits. This was merely advice to seek compound interest investments. If you have Liberty Bond coupons coming due or your regular dividends are maturing, resolve to re-invest the income in War Savings Stamps. These draw four per cent. interest compounded quarterly. Thus, will your money be made to do double duty and the war chest kept filled.

Remember the secret—invest the interest your money earns!

DENTAL MOTOR AMBULANCES WITH THE AMERICAN ARMY

BY F. C. MALONEY, D.D.S., AUBURN, NEB.

FORMER DENTAL SURGEON, FOURTH AND FIFTH NEBRASKA INFANTRY, MEXICAN BORDER SERVICE

Quoting First Lieut. C. Speakman, U. S. A., in his article in *Oral Hygiene* for January, 1918: "Soldiers to the number of a Division and a half kept at the Front by the dental surgeon—does this mean anything to us? And it was all made possible through the dental field ambulance. A member of the War Department in Paris remarked, when informed that Lieut. Speakman had returned with a fully-equipped dental motor ambulance, 'You could not have brought a more welcome gift to France.'"

Think of it! In France, after four years of war and as badly as they need food, ammunition and many other things, that none of these were as welcome as a dental motor ambulance.

And still we hesitate about shipping these ambulances to France. Why? Because they say we may try them out in our cantonments first. I ask you, gentlemen, if there would be any comparison between running one of these cars around in a cantonment on perfectly smooth and level roads and pushing one of them right up close to a trench where once in a while a shell will make your hand tremble a little, and possibly your puttees will rattle on your shin-bones?

Why do we have to try out these very essential things when already France and England are using them more and more all the time? Let us profit once more by our allies' experience and get some of these ambulances over to France; and every time we send a division or more, let them be fully equipped with dental motor ambulances.

I do not believe the government would have to buy a single one of these for this entire war. I believe every one could be raised by popular subscription.

I myself will gladly go as dental surgeon in an ambulance, or any other way for that matter, even though I have a family and a good private practice. I am not a habitual kicker and kill-joy, but I do believe that the dental ambulances should be gotten into the army right now and before it is too late. I offered to raise by subscription enough money to fully equip an ambulance and go with it myself, but was informed that it would not be accepted by the department at this time, in accordance with orders of our commander abroad.

Oh, why does something like this have to be held back? Why do we have to beg our government to let us not only help, but to *perform* possibly as great services to our men in the trenches as any other unit in the army or navy? Let us have a concerted movement started without delay and try and have these ambulances accepted at once. We surely can do it; so let's go to it and not put it off.

Let the magazines cut out a little of this root-canal and local-infection "hot air" that only can be used for rich people, and tell the profession what is going on in the Dental Corps of the army and navy, because maybe you and I will be "in there" next, and when we are you will see that these root amputations, prolonged root-canal treatments with X-ray after X-ray are absolutely worthless. If you doubt this statement ask any army dental surgeon if he has time to pull off any of these $50 or $100 operations. It can't be done.

One dentist to one thousand enlisted men! Let us realize that the man giving up his practice and going into the army and navy is a man, and usually all the way through, and we can help him more than any other way by mentioning the army conditions and what we who stay at home and get the cream are doing to help the Dental Corps to which he has given all.

Do you suppose that the average dental surgeon in the army, when his terrible day's work is done, wants to come to his tent, pick up a dental magazine and see where some extremely remarkable dentist has discovered something else that now takes days to treat which used to take minutes, and goes on with page after page of what I consider at this time *wind;* and maybe finds a page or two on the Dental Corps written by some man who considers himself, and anything he may say, as too small to crowd on the big fellow any, when there should be pages and pages of army and navy dentistry? I have a D.D.S. behind my name and am surely proud of it, and if it should be my fortune to serve my country, the big fellow with all his superfluous letters will be working right along side of me, "pluggenemup" with amalgam, gutta percha and cement, and once in a while treating a pulp, but usually extracting. Then what will you need of all this stuff? Until this war is over, tell us what our dentists in the service are doing, and what we can do for them. At least, let's make 'em think we appreciate what they have done and are doing.

This may not sound right to some people reading this; but I have had one crack at the army, and if you fellows think you put in a full day's work in your practice you don't know anything about it.

If I can wake up one of you talented men and turn your intelligence toward bettering conditions for our compatriots in the army, I don't care what the rest may think of my style.

Come on, some of you! Start the ball to rolling; let's let the boys in camp see that we are pulling for them with all our might!

A FEW FACTS ABOUT THE PREPAREDNESS LEAGUE OF AMERICAN DENTISTS

BY J. W. BEACH, PRESIDENT, BUFFALO, N. Y.

THE Preparedness League of American Dentists was organized nearly two years ago, about fourteen months before war was declared. Our trustees were Drs. Low, Burkhart, Hinman, King and Brophy, with an advisory committee of twenty-seven, as follows: Drs. H. L. Wheeler, L. L. Barber, S. D. Boak, H. C. Brown, F. M. Casto, O. U. King, W. H. G. Logan, G. N. West, T. B. Hartzell, F. W. Hergert, F. O. Hetrick, J. D. Millikin, A. W. Viney, C. J. Lyons, H. E. Friesell, E. C. Kirk, J. V. Conzett, B. H. Smith, F. T. Murlless, M. F. Finley, T. W. Brophy, T. P. Hinman, H. A. Pullen, F. W. Low, M. B. Eshleman, H. J. Burkhart, J. W. Beach.

In his president's address at Louisville, July, 1916, Dr. Hinman endorsed the League and recommended its support by the profession. The committee on "president's address," of which Dr. Casto was a member, accepted a resolution recommending endorsement of the League by the N. D. A. and the appointment of a committee of five members of the association to act with the officials of the League in effecting a more permanent organization. This was duly passed by the House of Delegates.

Directly after the declaration of war, Dr. Kirk was appointed dental representative on the General Medical Board, Council of National Defense. He was called to Washington about the 10th of April, 1917, and asked to submit to the General Medical Board plans for utilizing and mobilizing the dental resources of the country for war purposes. In one hour's time Dr. Kirk submitted a document which always will stand as a masterful effort, comprehensively covering the situation and displaying that keen foresight and rare discernment which ever has been characteristic of one of the most profound members of the dental profession. The views of Dr. Kirk, were accepted without debate and he then was appointed chairman of the Committee on Dentistry, with power to choose such members as he deemed necessary to carry out the purposes of the committee.

The Preparedness League was recognized by Dr. Kirk as one of the sources of aid to our government and, therefore, created the sub-committee on Preparedness League of American Dentists of the Committee on Dentistry with the following members: Dr. Hoggan, Richmond; Dr. Torsch, Louisville; Dr. Casto, Cleveland; Drs. Tracy and Ash, of New York, and Beach, of Buffalo, chairman. The League has been represented by its chairman at each of the seven meetings of the Com-

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*Read before the Ohio State Dental Society, December, 1917.

mittee on Dentistry held in Washington from April 15th to July 25th, inclusive. The committee has continued under the leadership of Major Logan, who succeeded Dr. Kirk, and who already has done the greatest work ever accomplished by one man for our profession.

Thus you will see that our League is properly recognized and well connected. Our primary objects were, first to make dentally fit the applicant for enlistment who was rejected because of mouth conditions and who was unable to pay the necessary fee, and, second, to establish sectional units for the purpose of studying war oral and dental surgery.

Both objects have been faithfully carried forward, to the great benefit of thousands of recruits and to the glory of our profession. In the early part of last summer First Lieut. Bissell B. Palmer, Jr., of New York, member of the Dental Corps of the National Guard, laid before Major General John F. O'Ryan a plan for giving the guardsmen gratuitous dental service, with the assistance of the civilian dentists of the state. Major General O'Ryan gave his consent and hearty co-operation and issued orders accordingly. The following letter gives some idea of the results:

HEADQUARTERS DIVISION
NATIONAL GUARD, NEW YORK
MUNICIPAL BUILDING, NEW YORK CITY

Dr. J. W. Beach, July 18, 1917.
President Preparedness League of American Dentists,
131 Allen Street, Buffalo, N. Y.

Sir: I am in receipt of the report of First Lieutenant Bissell B. Palmer, Jr., Dental Corps, covering the work performed by the dental profession of this state under the supervision of the Preparedness League of American Dentists, in furtherance of our desire to have the teeth of soldiers of the New York Division in proper condition for field service. What has been accomplished through the practical patriotism of the dental profession is truly remarkable, and is quite beyond anything expected. The report shows that the teeth of 17,005 men of this division were examined by members of the dental profession; that 10,032 teeth were extracted and 8,685 teeth filled. All this professional service and the materials used were furnished without expense to the state or government, and they constitute a most valuable and substantial contribution to the cause.

Will you be good enough to make known in some way to those who have contributed to the above accomplishment, the appreciation and thanks of the officers and men of the New York Division? Very respectfully,

(*Signed*) JOHN F. O'RYAN, *Major General.*

This movement led to a broader conception of our possibilities and usefulness, and Dr. Chas. F. Ash, of New York, conceived the idea of extending these activities to include all drafted men of the new National army. It was a colossal conception and a colossal task. Accompanied by First Lieut. W. A. Heckard, D. R. C., also of New York City, Dr. Ash, representing the League, went to Washington and conferred with Major Logan, resulting in his approval. Lieut. Heckard was detailed on active duty to represent the Surgeon General'soffice in this great work.

A great plan has been evolved and now is in operation all over the United States. Dr. C. F. Ash is Director of Departments for the

League. Directors of Dental Activities for the six military divisions are as follows: Northeastern, W. D. Tracy; Eastern, F. T. Van Woert; Southeastern, T. P. Hinman; Central, C. N. Johnson; Southern, W. D. McCarty; Western, J. D. Millikin.

Each director of a military division has appointed active and representative men as state directors who, in turn, have chosen sectional workers until the individual dentist is reached. The result of this great machine, directed by Dr. Ash and Lieut. Heckard, is that hundreds of cards are being received daily at our New York headquarters, 50 East 42nd street, each of which tells its own story—that one more man has been made dentally fit to go forth to protect the greatest flag that floats over the greatest country of the world. Thousands of these cards already are filed and we have scarcely begun.

Is there a single dentist within hearing who does not want to be a part of this magnificent work? Is it not a great satisfaction to be able to say, "I made ten men dentally fit and therefore I have ten men fighting for me in the trenches"? Our duty is plain; we cannot escape.

Captain Donovan, of Buffalo, was walking along a street in Berlin less than one year ago when he met a young German officer whom he knew. Capt. Donovan said to him, "Tell me, who is going to win this war?" "I am," replied the officer, and hastened to add on seeing a peculiar expression on the face of Capt. Donovan, "that is what every German soldier in the trenches is telling himself, and that is the reason we will win." Gentlemen, this is your war and each of us must do all he can and then do thrice more, if he is to stand by his country, his flag and his profession.

The Preparedness League of American Dentists is the official avenue for this work and we need your earnest support. We have sent out more than 425,000 printed pieces which have cost a great deal of money. We must have more and we now officially start a campaign for 10,000 new members.

A peculiar situation developed the other day at the League headquarters. I asked my secretary if I ever had paid the membership of one dollar necessary to consummate my membership. "No," said she, "you are not a member of the League."

That information was rather staggering under the circumstances, and so in consideration of the benefits I have received from my connection with the League, I am pleased to open the membership campaign by presenting this check.*

In addition, I wish publicly to thank the dentists of Ohio for their splendid support of our organization and am proud to say that we have nearly 1,300 members in this state, comprising sectional units in each component society district.

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*Dr. Beach has requested that the amount of his contribution may not be mentioned at this time—*Editor*.

AMALGAM FILLINGS*

BY C. H. WOOLGAR, M.D., D.D.S., MAGDALENA, NEW MEXICO

IT IS A MATTER of satisfaction to the dentists who have for many years past been convinced of the importance of amalgam for restoring portions of teeth, to see that this subject has in the last few years received special attention from some of our most able dentists, some of our dental colleges, and a few alloy makers.

I have the pleasure today to present to you some of the technic of tooth restoration with amalgam; some of it is the work of others. We must get away from the idea that amalgam is a cheap filling, and thus try to justify our poor amalgam work. Amalgam is the most used and the most abused tooth-filling material. The cleaning out of a cavity and inserting a large pellet of amalgam is too common, and must be condemned.

The public have been willing to pay a fair price for poor amalgam work; properly instructed, they will be willing to pay for and will demand good amalgam fillings. Who has educated the public to look upon amalgam as cheap, to expect a filling for one dollar?

Amalgam fillings properly inserted require as much care and nearly as much time as gold fillings, and are often their equal for service and saving the tooth, and properly inserted and finished are fillings of beauty. One is constantly seeing amalgam fillings inserted into teeth with poor cavity preparation, no anatomical restoration of the tooth, poorly mixed alloy and without the use of a matrix.

The teeth that amalgam should be used in to restore to usefulness are especially the bicuspids and molars; these teeth are sometimes so badly decayed and broken down that amalgam is the only material to fill and restore these teeth to usefulness--sometimes it is the only material that can be used to save a tooth from being extracted.

The technic of amalgam fillings may be divided as follows: Cavity preparation, matrix, mixing amalgam, packing amalgam, finishing filling.

Cavity preparation: Dr. Black has worked out a technic of cavity preparation and has given his work to the dentist. Most of us are familiar with Black's technic of cavity preparation; there is no question it is the most perfect technic of cavity preparation we have. I believe lack of correct cavity preparation is responsible for most of fillings that fail.

The outline of enamel cavity wall, when finished ready for the filling, should be placed in as immune an area as possible, in approximal cavities, the gingival margins just below free margins of gum; buccal and lingual margins so placed that the chewing of food polishes these margins and keeps bacteria from starting new focus of decay; occlusal cavities, the outline should not only include all decay but all pits and fissures contiguous to the cavity and susceptible to decay.

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*Paper and clinic presented before the New Mexico State Dental Society, 1917.

The Resistance Form of the Cavity: "Should be the same for amalgam as for gold, namely, a flat gingival wall with definite angles, and a broad, flat step or pulpa wall. The base of cavity should be at right angles to the force of occlusion and usually at right angles to the long axis of the tooth."—*Crandall.*

The Retention Form of Cavity: According to Black, is box form, with flat seat with very little undercut. Sometimes the pulp chamber can be used to advantage to aid in retention. I never use post placed in roots for retention; a post interferes with packing and adapting the amalgam in the cavity.

Finishing Enamel Wall: The enamel wall should be correctly finished. Dr. Crandall has ably stated: "The enamel should be beveled and the cutting should be the entire depth of the enamel. The angle should be just sufficient to remove safely from the surface all short rods which might become fractured after the filling has been placed."

Keeping Cavity Dry: Many dentists hold to the idea that it is not necessary to keep a cavity dry for amalgam; this is a wrong idea. Dr. Mathews claims "a little moisture in a tooth means a non-water tight filling and probably staining of the tooth substance from black sulphide of silver." A little moisture prevents perfect union of the pieces of amalgam in a filling.

Matrix: Before the amalgam is prepared for filling the cavity, if the cavity is a compound one, a matrix is needed. There are a number of kinds, all probably have some merit. Number 1 and 2 I have devised, are used with a thin strip of copper or German silver; they are made to conform to the various forms of teeth.

Mixing Amalgam: According to Black, "The alloy should contain just enough mercury to make a plastic mass that will take the impression of the skin markings, after prolonged, vigorous kneading. Any more mercury weakens it; any less mercury weakens it." The proper proportion of alloy to mercury is given by all the good alloy makers. Poor amalgam fillings are usually due to the dentist, not the alloy makers. The right proportion of mercury for the alloy I am using, for small pellets, are nine to eleven; for large pellets of twenty or more grains, the proportions are nine to twelve. The scales here shown, made of copper, one is for small pellets, ratio of nine to eleven, weighing large or small quantity of alloy as desired; the other scale weighs alloy for large pellets, ratio of nine to twelve. The amount of time required to weigh the alloy and mercury with these scales is only a few seconds. Mix alloy and mercury in a mortar for about two minutes, transfer and thoroughly knead amalgam in the palm of the hand; remove the surplus mercury by compression.

Packing Amalgam: The cavity properly prepared, matrix applied if indicated, cavity dry, instruments selected for packing the amalgam, the alloy and mercury are now mixed, a small pellet is placed in cavity and carefully adapted to the wall of cavity. According to Crandall, the first piece need not be as dry as the succeeding pellets; this helps in adapting the amalgam to the walls of cavity.

The amalgam pluggers should easily reach any part of the cavity, and should be serrated. The serrations of some pluggers fill and retain some of the amalgam, producing a smooth face on the plugger. If this occurs the amalgam should be removed from the serrations. The pluggers used in this clinic seldom retain any amalgam in the serrations, the serrations being cut after the form of a bicuspid tooth with shallow pits. The force applied to the amalgam is nearly all spent in a straight line with the shaft of the instrument. Very heavy hand- or mallet-force is required to thoroughly adapt the amalgam to the cavity wall. After the floor is covered, larger pellets are added, thoroughly adapting each pellet, with as large a plugger as cavity will permit, working some of the amalgam over the edge of cavity margins. The packing of the amalgam will usually bring some excess mercury to the surface of the filling; this is scooped off and drier amalgam added, producing a very dense filling. When the cavity is filled there should be no excess mercury on its surface. If one has an assistant, the assistant can knead the amalgam, keeping the amalgam in a working plastic condition while the filling is being placed. After the filling is inserted it should be allowed three to four minutes to harden before matrix is removed, or any more work done on the filling. Care must be exercised in removing the matrix or the filling will be damaged, necessitating a new filling.

Finishing Filling: A very important part, often poorly done. The original shape of the tooth should be restored, cusps, grooves and pits. For the restoration of pits and grooves, burnishers and one or two small spoon excavators are required. Care should be exercised in finishing to see that the filling does not prevent proper occlusion of the teeth. The case is dismissed to some future appointment when the filling is polished.

The approximal surface should be finished the same as a gold filling; on the occlusal surface if disks are used. Extra care must be exercised or the surface will be flattened. For finishing this surface, I have found a fine grit strip attached to a specially prepared mandrel quite satisfactory, and to produce a bright polish by using an extra fine strip.

Do Not Extract So Many Teeth

The extracting craze is having its day and the pendulum is swinging very far from the medium line. Throw out the clutch and apply the brakes at once. In other words, don't extract every tooth simply because there is a shadow at the apex on the X-ray film. With modern methods and painstaking care, many of these teeth can be saved.

—*W. O. Fellman, Oak Park, Ill., Dental Review.*

FOCAL INFECTIONS AND SYSTEMIC DISEASE—DIAGNOSIS, TREATMENT AND RESULTS*

BY P. F. SCHAFFER, D.D.S., CHARLESTON, W. VA.

SOME DENTISTS and a few physicians likewise are of the opinion that too much emphasis has been given to the theory that apical abscesses of teeth and infections of the peridental membrane are very common causes of many of the bodily ailments adjacent to or remote from the mouth. It is not improbable that the damage done by oral foci in the production of systemic disorders often is overestimated, since over-enthusiasm is generally the rule following new medical discoveries. Time is required to determine the exact truth relative to the part which such foci play in bringing on systemic disorders. However, so much already has been conclusively proven and the theory is so reasonable that no physician or dentist can ignore its possibilities.

It is poor logic for either medical men or dentists to attribute every ailment to which man is heir to foci of infection; but to overlook well-proven facts is equally illogical. The pride of the dentist often is touched when his field is invaded and his operations criticised; yet in the light of modern methods of examination, namely, the X-ray, some of the work of our best operators is seen to be imperfect, and the criticism therefore justified.

EXTRACTION AFTER MALPRACTICE

Nevertheless, I would urge for the sake of harmonious professional relations and consequent benefit to the patient that the diagnosis be left entirely in the hands of the dentist and radiologist. Often physicians send patients to the dentist with the foreword that certain teeth are to be extracted. From the medical standpoint, as well as the dental, the object of treatment of infections of the teeth and mouth is conservation of the structure and function of the teeth and other mouth tissues, so far as possible. This being the case, the physician who prescribes such radical treatment without a most thorough scientific examination and logical diagnosis is performing malpractice, as is the dentist who will follow instructions of such nature.

The object of this paper is not that of criticism, since "people who live in glass houses cannot well afford to throw stones." It is to be, rather, a recital of facts which have come to light in the course of an effort on the part of the physician and dentist to understand the cause and the mechanism of production of a large group of more or less disabling ailments, which for years have been baffling the physician.

A very common attitude of many of us in the past toward mouth infections has been one of comparative indifference. This lethargy has changed to concern on the part of the physician, the dentist and the layman. All are now awake to the possibilities of such conditions, and the radiographer has everywhere been working overtime in an effort to afford information as to whether or not the jaws harbor lurking causes for secondary manifestation of disease.

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*Read before Kanawha Medical Society, April 3rd, 1917.

Every new proposal or discovery in medicine, or any field of human activity, must go through such a phase before it takes its place amongst recognized procedure, and becomes rational instead of empirical. This never has been better illustrated than in the present discussion of the alveolar abscess and its relation to systemic disease. It would appear that the great prevalence of alveolar abscess was, until recent years, as little suspected by many of the dental profession as by physicians; although the importance of oral sepsis was pointed out by Miller in 1891, in his work entitled "The Human Mouth as a Focus of Infection."

NECESSITY FOR RATIONAL TEAM WORK

Now that the facts are becoming known to a great extent by reason of the radiographic technic, many readjustments of practice have become necessary on the part of the dentist, as well as the physician. It is the hardness of these readjustments which have led to a certain temporary misunderstanding between dentists and physicians, and to which I have referred indirectly in the first part of this paper. For the correction of these misunderstandings, there is essential only frank discussion and a little of sympathetic team work between surgeons and physicians.

With these views in mind, I cannot help but look with pleasure upon this opportunity to address your honorable society. I feel that it is both an honor and a step toward a better understanding.

In the real body of the paper to follow, I have tried to base my ideas on clear, practical and scientific knowledge; that which can be applied to everyday practice, and have tried to stay as far as is possible (as a discussion of this nature will permit) from statistics and statistical reference. For this you have your research institutes with their reports. How much better is this than the words of an unauthorized discourser!

MOUTH INFECTIONS

First, I shall consider the various sources of Mouth Infections which are the *focus* of disease in various parts of the body. They can be divided into three chief classes:

First: The Alveolar Abscess with pus.

Second: Alveolar Abscess, without pus, a dental granuloma or blind abscess.

Third: Pyorrhea.

Of these three forms of mouth infection, the alveolar abscess with pus is the most important to the physician, since it is the closed abscess which usually gives rise to the metastatic infection, and it is this metastatic infection with which the physician is greatly concerned. Next in importance from a medical standpoint is the alveolar abscess without pus or the dental granuloma, where there is a distinct growth of granulation tissue with its fibrous envelope. This was known in the older literature as the blind abscess. There is really in these granulomas no abscess, or no pus; but they are simply filled with streptococcus viridans, whose low degree of virility seems to make it impossible for them to produce pus; but they seem to have the power of producing a toxin as powerful as could arise from pus itself.

You may ask how are these infections brought about? Never through the nerve of a live tooth. It is always a dead nerve which gives rise to infection and pus, or the gaining entrance of infection during the process of removal of a dead nerve from a tooth, or infective irritation following root-canal work.

The chronic alveolar abscess as a source of infection may be classified as Primary and Secondary. The *primary,* those in which infection occurs through the root canal from an infected pulp, from faulty technic in root-canal treatments, and from a failure to adequately seal the root canal and pulp chamber in introducing permanent filling materials.

Those infections classed as *secondary* are blood borne, the predisposing cause being a lowered resistance of the periapical tissues, brought about first by the careless use of arsenic as a devitalizing agent by the dentist, and second by irritants in root-canal treatment. The irritation set up in the tissues at the apex of the root of the tooth results in cell proliferation and scar tissue, which interferes with the normal circulation. The resistance of such areas is low.

LOCALIZED BACTERIA IN THE AREA

The bacteria which have been localized in alveolar abscess are many, the most important of these being the streptococcus viridans, of both the hemolytic and non-hemolytic strain. It is the predominating organism. This has been determined conclusively by the researches of Gilmer, Moody and Davis This bacterium seems to have a special affinity for heart muscle. If the endocardium of the heart is scarred by old disease, it therefore has a better soil, and enormous vegetations may be produced on the heart-valves through metastasis. Another less hemolytic type of streptococcus viridans may produce changes in joints and muscles, and have no affinity whatsoever for the heart endocardium.

The Research Commission of the National Dental Association, the University of Minnesota Division, under the direction of Thomas B. Hartzell, M.D., D.M.D., and Arthur T. Henrici, M.D., after two years of careful and scientific investigation of the disease-producing possibilities of mouth streptococcus, gives in the July number of the *Journal of the National Dental Association,* the result of the inoculation of 225 animals with streptococcus. The result of this work shows conclusively that both hemolytic and non-hemolytic streptococci, not alone in an abscess, but taken from the free saliva, can produce valvular trouble, endocarditis, arthritis and kidney lesions in rabbits. Someone may say, however, that it does not necessarily follow they must be equally destructive to the tissues of the human body. Dr. King, in the same number of the journal, replies to this possible argument as follows: "It is an acknowledged fact among the pathologists of the world that ninety per cent. of all heart disease is of streptococcus origin, and post-mortem examination of these cases reveals the fact that most of them show streptococcus viridans of a non-hemolytic type." Dr. John E. Nyman, of Chicago, in a discussion last June, before the American Medical Association, says that he can relate a list of diseases that were definitely relieved, even cured, by correcting abnormal conditions of the mouth. The list includes arthritis, cardiac derangement, intermittent angina, spastic constriction of the colon, reflex neurosis and insomnia.

The relative danger of chronic abscess compared to pyorrhea is hard to determine. While a closed suppurating cavity is more dangerous than an open one, the quantity of infection is apt to be much greater in pyorrhea. Pyorrhea can be said to be the lesser of the two evils, but not to any degree of tolerance.

DIAGNOSIS OF MOUTH INFECTIONS

It should first be clinical or visual. In this way the examiner obtains a clue as to the nature and extent of the X-ray or radiographic examination. Look for pyorrhea, ulcerations, sinuses, swellings, etc. Palpate the submaxillary lymph nodes with the index finger on the floor of the mouth, pressing downward against the fingers which are beneath the chin. The dentist must then determine which teeth contain vital pulps. These vital teeth can then be eliminated from the diagnosis. Then comes the X-ray photographic examination. While the X-ray is relative and not absolute, we are dependent upon it for our estimate of tissue loss. The interpretation of these films is an art. A large granuloma may involve only the spongiosum of bone, and where the external and internal plates are thick and dense, the X-ray will not define the area.

To differentiate between what is an active infection and a rarefied area which has been treated and is undergoing repair is difficult. It often is impossible, under a dense field of bone. Also, where exposures are made from an angle, tooth roots are often found to obscure areas of rarefaction. Despite all this, the X-ray is indispensable, and is the really scientific, though not always infallible, method of diagnosis.

That infection often is found on X-ray examination, and that it is prevalent in the mouth, has been established in the clinics. Dr. Billings, in the Presbyterian Hospital of Chicago, in the examination of 150 cases referred for mouth examinations, 89% had alveolar abscess. In the Cook County Hospital, 329 patients in a medical ward showed 44% had alveolar abscess. In an arthritic group, 76% had alveolar abscess; in a nephritis and cardio-vascular group, 47% had alveolar abscess; in a gastro-intestinal group, 28% had alveolar abscess. No more conclusive evidence of the relation existing between the mouth and body could be given. All these related cases cannot be explained as a mere coincidence.

TREATMENT

This is one of the most important phases from the physician's standpoint. The objects of treatment are two: First, to save the teeth; and second, to rid the mouth and body of the focus of infection. This is the work of the dentist. Where a large portion of the tooth's peridental membrane is destroyed by the infection, there is little hope of saving that tooth. This is often found in the advanced cases of pyorrhea. This is one place where extraction of a radical nature is indicated, for these cases do not respond often under the care of our most skilled specialists.

In chronic alveolar abscess, the treatment is either (1) conservative, or (2) radical. The first type saves the tooth and removes the infection. The second type removes the tooth and is a sure method of removing all the infection at that foci. In the first or conservative treatment, there is involved the opening of each root canal at the foramen, the curettment of dead or rarefied areas of bone, the cleansing of soft tissues, if necessary, or the amputation of the apical end of the root of the tooth, if the X-ray shows it to be diseased or resorbed to such an extent as to be itself a form of bone sequestrum. Again, I cannot make it too emphatic that, in my opinion, *extraction should be resorted to only as a very last and radical measure.*

No treatment of oral focal infection is complete without the physician's co-operation. He must see that the patient receives plenty of rest, fresh air, nourishing food, freedom from care, and a good general medication when needed.

The question of the use of vaccines in a cure is vexing. I will not go into the details of such a treatment. The conclusions of men who have thoroughly tried out vaccines in practice and not theoretically is that they are unnecessary if the dental treatment is thorough, and that it is both futile and foolish to attempt to substitute the injection of vaccines for drainage.

In conclusion, I wish to explain my failure to go further into detail of the treatment, as well as my disregard for sinus and infections of the glands, on the score of a lack of time, and the realization that this is up to the dentist, and the physician cares not how the dentist gets results just so long as he gets them; and thus minimizes the physician's responsibilities as well as his own.

If this paper has succeeded in bringing home the importance of the following points, my efforts tonight may not be without results:

First: The very great responsibility which these systemic involvements of focal infections has thrust upon both the physician and dentist, which means a broader education and broader study of the anatomy and physiology of the body as a whole by the dentist and the physician.

Second: The importance of mouth hygiene.

Third: The preservation of the nerves of teeth alive, which means that physicians should recommend for their patients early dental treatment, even going so far as to make the demand imperative.

Lastly: A more healthy co-operation between the physician and dentist.

REFERENCES FROM SPECIAL ARTICLES

"Clinical and Experimental Study of Chronic Alveolar Abscess in Relation to Systemic Disease."—Thomas Gilmer, M.D., D.D.S., Sc.D.

"Co-operative Organization in Dental and Oral Surgical Practice in the Diagnosis and Elimination of Chronic Mouth Infection as a Factor in Systemic Disease."—Robert H. Ivy, M.D., D.D.S.

DENTAL SUMMARY—"Report of the Mouth Infection Research Corps of the National Dental Association."—Arthur T. Henrici, M.D.

Journal National Dental Association—"The Prevalence of Chronic Mouth Infections and Their Management."—Frederick B. Moorehead, M.D.

Journal A. M. A.—"Dental Infections and Systemic Disease."—Ernest E. Irons, M.D.

A PERSONAL EXPERIENCE

BY DR. J. P. SLATER, OMAHA, NEB.

Patient began to have slight headaches about twelve years ago. Thought they were due to autointoxication; after taking a physic felt normal. Headaches would come on every ten days or two weeks. During their duration patient felt somewhat stupid and listless. Finally the headaches became more frequent and severe and patient had to leave practice for twenty-four hours or more. Attacks would come without warning.

Consulted an oculist who found a slight astigmatism in each eye and fitted glasses to correct it. This relieved the condition somewhat for a time, but soon began to have same intense pain over the frontal sinuses as before. Was forced to stay at home in bed for twenty-four hours at intervals of one to two weeks. The attacks would take all of patient's vitality.

Had glasses refitted about every six months without much change in glasses or condition. Consulted with another oculist who refitted glasses several times and was checked up carefully by assistants, without giving any relief.

At last one of the doctor's associates decided that the patient's eyes were not causing all the trouble and advised an X-ray of all the head sinuses. Sinuses were found in normal condition. About this time the patient decided to have an X-ray taken of an upper left first molar which was devitalized about fourteen years ago. The X-ray showed roots in healthy condition; also showed upper left third molar unerupted and impacted against the distal root of second molar.

Sent to Dr. H., exodontist, who removed third molar by conductive anesthesia. Tooth has been removed about six months; have had only two slight headaches since.; brain much clearer and have not had that half doped, "morning after" feeling which was present before. Feel more energetic and more like a normal healthy person.

Before operation the patient had to retire at about 8:00 or 8:30 P.M.; could not read much; unable to stand bright lights and theatres or noises without suffering the next day. Patient can do all of these to rational extent now without inconvenience.

A HISTORY OF FIFTY YEARS' WORK*

BY HENRY W. MORGAN, M.D., D.D.S., NASHVILLE, TENN.

(In introducing the speaker the toastmaster made the following remarks:)

THE TOASTMASTER: Once again we turn to the history of our association. It is fitting, for the bringing of it forth in order that we may understand it the more fully, that we have the son of one of those grand old fathers, one of the organizers of the association, with us. Yet this son is not riding on the laurels of his father. He stands with us on his own foundation. He stands with us as a man among men. He has done his own work in life. His reputation was not built on the reputation of his father. What he has made of himself belongs to him alone, and I ask that our good friend, our elder brother, my living comrade, Henry William Morgan, now speak to us.

Mr. Toastmaster, Ladies and Gentlemen:

BEFORE ANY REFERENCE to the subject that has been assigned to me I wish to enter a mild protest and a disclaimer to some of the things that the toastmaster has taken the liberty to say in introducing me. I wish here to make acknowledgment to the fact that all that I am, all that I may hope to be in the future, I owe directly or indirectly to that great man that I called "Father." I yield to no man a first place in love and reverence for his memory.

I shall not speak in any great length of the history of the state dental association, which has been assigned to me, for the reason that you have heard that so beautifully told already by Dr. Mewborn, and it is not necessary now that I should, though I have had in mind many of the things he has said. I will, however, mention the names of three persons who should be familiar to the profession as connected with some of the things that we use in our daily practice. Two of these men have passed away, one of them an ex-president of the association. Taken in the order of the appearance of their inventions, the first name is that of Dr. Alexander Hartman, many years a practitioner at Murfreesboro, Tenn. The profession is indebted to him for the idea of a "flexible cable" to a dental engine. It was he who owned a patent on this word "flexible" and afterwards sold it to Dr. S. S. White for a small sum, when he might easily have had many thousands for it. Dr. Hartman was a charter member of the association and died eight or ten years ago in the state of Ohio.

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*Address at the Golden Jubilee banquet, Tennessee State Dental Society, 1917.

About the year 1874 Dr. W. L. Dismukes exhibited for the first time at the state meeting that indispensable little article, the sand-paper disk. His disks were stamped out with a gun-wad cutter. I doubt if there are any here who would like to continue practice without that disk. It is so effectual and enables us to do our work so much more rapidly and artistically than otherwise would be possible. It is to Dr. Dismukes' credit that he never attempted to patent the disk.

The third name I wish to mention in this connection is that of an ex-president of the association, the late Dr. Gordon White, who devised what is known as the "Gordon White Separating Saw and Holder," which has found its way into the armamentarium of nearly every dentist and college equipment. This, likewise, was not patented. All honor to these men who have, even in a modest way, contributed to make our work easier and more perfect. In loving memory their names should be inscribed in the hearts of our profession.

The fact that Dr. Mewborn's speech covers so many things that I have had in mind and would like to have spoken of, recalls an episode in the life of Mark Twain which he is said to have enjoyed telling. He and that great New York speaker, Chauncey M. Depew, were companions on a voyage across the Atlantic Ocean. At a dinner aboard ship they both were called upon for a speech. Mr. Twain preceded Mr. Depew and delivered one of his characteristic speeches, full of good humor and good nature, and when Mr. Depew was introduced, he announced that he was much embarrassed, that when he came into the dinner he had made an arrangement with Mr. Twain that he (Mr. Twain) would make his speech for him and he Mr. Twain's; and that in some way he had lost Mr. Twain's manuscript and consequently could not make Mr. Twain's speech for him. He sat down amid great applause. The next afternoon an Englishman met Mr. Twain on the deck and said to him, "Look here, Mr. Twain, I think you got the worst of it last night, for that speech you made for Mr. Depew was the veriest rot." I would like to have played the same joke on Dr. Mewborn tonight and have claimed his speech for mine, but that was impossible, for his paper has such a characteristic ring and is so filled with the loving spirit of Dr. Mewborn that all would have recognized at once that I had nothing to do with it.

As he paid the tribute and pictured the man who is to "take his place," I was wondering if he had in mind the answer the late Mr. Joseph Choate made to the question "if he was not the Hon. Joseph

Choate who would he rather be." He replied, paying the highest compliment to his wife a husband ever has done: "Mrs. Choate's second husband."

The history and progress of the Tennessee Dental Association has been set down after most industrious and laborious effort by the various secretaries who have served throughout the fifty years of its existence, and is found in five volumes. I am not going to bore you with a review of them tonight. The association today has authorized me to prepare a little pamphlet in which we are going to set down the main facts, and we will distribute those pamphlets.

There is one thought in my mind, occasioned by the closing remarks of the eloquent Rabbi you have just heard: "What comes the news from the East?" Right struggles bravely there against error. The great ocean of human thought is stirred to its profoundest depths. The storm is on the horizon, and the lightning is ready to leap forth against the ancient wrong and the hoary precedents of oppression. Before long we will rise some morning to find that storm shall have cleared away and the sound of the cannon shall be heard no more, and peace and happiness again shall come to this sorrow-rent earth. On the dawn of that new day wars and oppression shall be no more forever, and let us all reverently pray for it; when men no longer will work for money, nor for fame, but

> "Each in his separate star,
> Will draw the things as he sees them,
> For the God of the things as they are."

Sterilize the Tooth Brush

The tooth brush should be *cleaned and sterilized each time it is used.* Your patients should be instructed to have two brushes so one will always be sterilized and dry. They should use an air-tight receptacle for a sterilizer. It should contain a pad on which to place a few drops of formalin. After cleaning the teeth the brush should be rinsed and cleaned thoroughly, then placed in the sterilizer and closed tightly. When it is time to clean the teeth again use the other clean brush. When through clean the brush thoroughly, remove the sterilized brush, rinse and place the aluminum cover on it for protection from dust. Then put in the sterilizer the brush you have just been using.

—Arthur E. Peck, Dental Review.

OUR CONTRIBUTION TO THE WORLD'S STRUGGLE*

BY DONALD M. GALLIE, D.D.S., CHICAGO, ILL.

The toastmaster introduced the speaker as follows:

We have with us a man known widely, highly, deeply, broadly, a man whose voice can be heard from the Atlantic to the Pacific, a man who is called many times from the frozen north to the sunny south; a man who has traveled much, an inquisitive man. He likes to know things. He asks some questions, he insists upon knowing about this and that. Sometimes he even becomes like a child that asks too many questions.

I remember one time when he and I were younger and traveling about the world together, we were on a ship traveling southward, coming toward the equator. The captain was nearby and he was asking the captain every few minutes about that equator; he wanted to know just when we crossed. Directly the captain handed him the binocular and told him to watch and he would tell him the moment we were passing that he might see it. And so the doctor looking through the glass was watching closely, the captain beside him. "Now," the captain said, "turn the glasses downward toward the sea and watch closely; it will become visible as you turn it downward now. There—you see it!" "I do," he says, "I do; it is a distinct line. Thank you.' And he handed the glass back to our captain. And the captain, with a wink, pulled a hair off from across the glass. (Laughter.) That is the man who is with us tonight, and he also has come all the way down from the town I used to live in, where I made the Scotchman's acquaintance, and he, too, has come to honor this occasion with his presence. He came because he loves old man Cattell. I am sure of it, because when I met him first he put one arm across my shoulders and said, "Oh, David, I am glad to see you;" and I knew that he meant it. He has a story that he will tell, and I am sure you will enjoy it.

Mr. Toastmaster, Members of the Tennessee Dental Association, Ladies and Gentlemen:

IT IS A GREAT PLEASURE, indeed, one of the greatest of my professional career, to be here this evening to take part in this celebration of your fifty years of activity in dentistry. The semi centennial of any individual or organization is something we all look forward to, and something that we enjoy. The fiftieth year of a man's life is one of importance. The fifty years of union between husband and wife is one of the events we all look forward to, and all pray that it will be our blessed privilege to take part in celebrating such an occurrence. So with organizations, and upon the fiftieth anniversary of the Tennessee society I bring to you from the state of Illinois greetings and best wishes that you will continue in the splendid work you have done for the past fifty years.

When you stop to think that the profession of dentistry practically dates back to 1839, for it was in that year the first dental college was started, the first dental society organized, and the first dental journal published, so we look upon that year as the year of dentistry's starting out as a definite profession. The progress made has been astonishing. And when you consider that the profession of Tennessee has been active during two-thirds, we might say, of the life of the profession of dentistry it is something of which you have reason to be proud. But eight societies antedate that of the state of Tennessee as a state organization, and since then you have been great contributors to the profession.

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*Address at the Golden Jubilee banquet, Tennessee State Dental Society, 1917.

It was with much pleasure and interest that I looked up the history of your organization and the history of the men of Tennessee, and I found in every dental society in this country that your men have taken a foremost part in the conduct of these associations. In the Southern Dental Organization, with a life of thirty-two years, men from Tennessee were presidents twenty-five per cent. of the time. In the Central States organization men from Tennessee were prominent. And so it goes. Since the combining or merging of all the different dental societies into the great National Dental Association, Tennessee has contributed two men as presidents, Dr. Noel and Dr. Melindy. Not only did Dr. Noel preside with dignity, he also was thoughtful of those who in the sunset of their lives were not as fortunate as others, and he was the man who made provision for our old men, and we have him to thank for our splendid Pension Fund.

It is pleasing evidence of the modesty of your men here this evening that no reference has been made to the part you have played in dentistry and in dental education. It is true of this state, as of all the other dental centers, where men of the type of W. H. Morgan and his son, and J. Y. C. Crawford, and Noel, and Melindy, and Cattell, and many men that I could mention, men interested not only in the organization, but also in the education of our people. I can assure you, men of Tennessee, that you have dental schools in this state that you can be proud of. We look upon them, in the Institute of Dental Teachers, as among the foremost. You are to be congratulated not only on your organization but on your educational institutions.

It is a great pleasure for me to be here to pay tribute to my dear old friend, Dr. Cattell, who was one of my first teachers. If I am in any way fitted to occupy the position I do in the University of Illinois, I owe it to this master who started me out on my career in the study of operative dentistry as it should be taught. While I succeeded him in the Dental Department of the University of Illinois, I can assure you, ladies and gentlemen, that I fall far short of taking his place in the institution.

So Tennessee has contributed her full measure to our profession, but Tennessee and every other state in the union must contribute something more than the contributions to the profession of dentistry. The world is calling us today to contribute something more than that which interests you and me. When I was invited to speak this evening, I selected my own subject, "Our Contribution to the Great World Struggle." I selected this subject because it is nearer to me than perhaps any dentist here this evening. I think of it by day and dream of it by night, for I have, across the line, a dear old mother who celebrated her eighty-sixth birthday the 22nd of April by finishing her fifty-second pair of socks for the boys in the trenches. She has in this, perhaps the last lap of her great life race, many near and dear to her fighting for the principles so dear to people who love liberty and freedom. She has today several grand nephews in the line, and four grandsons fighting in the air, in the line and in the hospitals in this great cause; or she had until a week ago Thursday when a cablegram came, "Flight-Lieut. Keens of the Royal Navy seriously injured. Gun-shot wound through the chest; in hospital 14, France." And besides—and this makes it nearer to me still—she will see in a short time her only American grandson on his way to France.

In selecting this subject I felt I had some knowledge and understood something about the great part that our profession is playing in this struggle. When this great conflict started it soon was evident that the casualties would be so much greater than ever thought of in former wars, that the nature of the wounds received, on account of the method of warfare, was such that the most terrible face and head wounds would be received, and so the cry went out for surgical assistance. And the American dentists in Paris and in the allied countries of Europe heard the cry and they started a hospital in France. The call came to America for help, and there went out from this land a number of our American dentists to help the American Dental Society of Europe in the great work that they had started in that hospital. Among the number who went out was one of the old stalwarts of this profession, the Dean of one of the Philadelphia schools, Simeon Guilford.

In 1914, the opening of the war, I was elected president of the National Dental Association. On account of that office I received a great deal of correspondence from Drs. Hayes, Davenport and LeCron, who were so active in that hospital. They sent reports of conditions they found, requesting me to present them at the Pan-American Congress held in San Francisco in 1915. The conditions they described were something appaling. They made a call for more help, and that cry was heard over in Canada, that great sister country so near us, and there went out from Canada two hundred dental surgeons, not as a military organization but as a professional body. A recent report I have just read by one of the leading generals of the British army stated that of all the men who have been in this great struggle, and of all the service, the greatest for the soldiers was the services of the Canadian Dental Corps.

In one of the reports Dr. Hayes sent me he told of the conditions of five hundred wounded soldiers received from the dressing station. It was terrible. Believing that every precaution had been taken to guard against the admission of men whose mouths were not in shape to masticate the army rations, this report from him upset any idea we had along that line. He showed they were not in shape to masticate army food, that they suffered from diseased roots, were susceptible to all the diseases prevalent in the trenches, and their chances of recovery were jeopardized because of the septic condition of their mouths.

You have heard the old story of the Cockney who wanted to enlist; they were all so anxious and enthusiastic to go to the front at the opening of the war. He went to a recruiting station and his friends waited outside. He came out downcast. "What's the matter, Bill? Didn't they tike you?" "No, blymie, the blasted idiot, he turned me down on account of me teeth. Now you know, I didn't want to bite the Germans—I wanted to shoot them."

The report showed many of the Tommies were in about the same condition as the dear old woman who said she had two things to be thankful for, and that was two teeth, one above and one below—and she thanked God that they hit.

For years committees from the National Dental Association have made pilgrimages to Washington to try to get before Congress a bill that would bring about the appointment of dentists in the army and navy, with proper rank. We received but little encouragement. About twelve years ago Dr. Thorpe and myself were at a meeting in Washington, and we were called before the Naval Committee to present this matter, and with all the earnestness and with all the arguments we could produce we presented this question to the Naval Committee. We received little attention, except from Congressman Rixey, of Virginia, and Tom Watson, now Senator from Indiana. But until last year little was done, and at the last Congress a bill was passed appointing five hundred dentists to the army and navy. But now, since war has been declared by America against Germany, a cry comes from Washington for help, and we are told we must have twenty-five hundred dentists ready, and they want about a thousand, at least, to start with. They tell us we must give to them every graduate of this year, and not only that, they have told us that we must keep our colleges going at full speed so that our juniors and our freshmen also will be able to give service and do their bit for the government.

This gives you some idea of what they think at Washington of the duration of this war. It is not a case of fizzling out in three months. Such conflicts as this do not fizzle out; they must be fought to a finish.

Not only do they ask for the graduates of this year, and all told we only can produce beween sixteen and seventeen hundred; a large percentage of this number will be physically unfit for service, a great number will have ties that will make it impossible for them to serve; so we cannot depend on fifty per cent. of the graduates of this year. It means we must look to the men who are in practice, the men who have been out for some years, who will make the sacrifice, who will go and do their bit and take their place and prove to the world that dentists were not found wanting.

I heard Colonel Goodwin the other night, one of the chiefs of the medical department of the British army, who accompanied Balfour on his mission to America, and he told of the great needs of medical men in the army. He said America must provide twenty thousand medical men. He told why; he says today, in the great fighting on the west front, that the number of casualties are so great that England, her colonies and France, have been depleted of their medical men; that many cities in Great Britain today of from six to twenty thousand, have but two or three surgeons and physicians left. They are in Mesopotamia, in South Africa, in East Africa, in Egypt, and all over the world. The result is that today when a British soldier is wounded in France, as soon as they are able to move him, he is sent across the channel, because the aim is to keep fifty thousand beds always empty in France for possible emergencies. It is a short distance across the channel and the British soldier is taken to Britain and cared for there. But, as Colonel Goodwin says, when the American army crosses, it is three thousand miles across, and France has all she can do to care for her wounded; and when we send our army we must send medical men with them to take care of them, because they will not convalesce sufficiently to send them home for many days. So you see the great necessity for this call, and *you must awake.* The dental profession is as apathetic as all the other people of this land; they do not seem to realize what this war really means, that it must go on to a finish, that this is a war between men and people who want freedom and liberty and a combination of empires standing for might and force.

If you will go back in history you can see but one result. From the start it is a question of autocracy against democracy. The nearest illustration I can give of these two conditions dates back to the twelfth or thirteenth century, when the people of England demanded of King John the Magna Charta, and from that day down there has been an earnest effort by the people of Britain to enforce their rights and make the government and the crown hold to the promises that King John made them. There have been at times almost a successful effort to get away from that; for instance, when Henry the Eighth declared himself supreme in state and in church, the people of Britain thought the time had come when democracy could not live. The Stuarts attempted the same thing, and Charles the First's head paid the penalty. Britain had Cromwell and his Roundheads to fight for the principles so dear to those people. The same spirit and blood fought for the same principles in 1776, when this country freed herself from the Hanoverian King George the Third, and in 1812, the same principles were at stake, and in 1861 and 1865 the fight was for the same principles, both sides thinking they had the same right and they were fighting for the same principle. Fortunately, that is settled satisfactorily to us all.

In 1898 we again fought against a tyrannous nation to liberate little Cuba. So it goes. Take on the other side a combination of powers, backed by a dynasty and backed by a government that stands for might against right; that stands for the divine right of kings, and their successful launching of that principle dates back to the Elector of Brandenburg. Any pacifist who says this war is a result of a disagreement in 1914, or because of the assassination of the Austrian prince, does not know his history, and does not know the real things back of this. They have only to read Trietsche and Nietschke, Bernhardi and other German writers whose writings are of recent date, to find the very things they contended for and preached and fought for are today the principles on which the German Empire of oppression is standing. We all know what Bismarck said after he had conquered France in 1871, when he saw that great nation coming to life again and showing they were still able to live and progress. He tried to pick another quarrel, and you remember the terrible statement he made: "The next time we attack the French we will leave them nothing but their eyes, that their tears may pour from them." These teachings are taught the people of the central empires today, and the Prussian still thinks he is right in fighting for the principles that are advocated and backed by dynasty and government of the central empires.

I have a friend who studied for three years in Germany—in Charlottenberg—a few miles from Berlin. He used to go to an interesting book store. One night while he was there he heard the tramping of feet, and there passed a perfect fighting machine—a German regiment. Their tramping made the little building tremble. He turned to the bookseller and said, "Aren't you sick of this? Don't you get tired of paying taxes to keep up this spectacle?" The little man said, "That is noddings. Der dramp of dose feet vill be heard some day all around der vorlt." So they have been taught by their statesmen, the officers and those of the military rank, that it will be for the world's good when they are able to say, "Deutschland Uber Alles."

We have tried our best to keep out of this, but today are in conflict with this power that is fighting for the subjection of the people who believe in democracy and freedom and human rights.

So in the call that is made to us we must make every sacrifice that it is possible to make. We must send our boys to the front to care for the millions of men who are fighting our battles. Our boys are more fortunate than most, for they go into the Officers' Reserve Corps with the rank of first lieutenant, and they will be able to do wonderful work. Many will feel that they are going to become oral surgeons, that they will have the opportunity of their lives. Some may have an opportunity of seeing wonderful operations, but the great majority of our boys will be only oral scavengers, because the great call for men of our profession is to care for the diseased conditions that develop in trench warfare, known as trench mouth; and that condition is terrible, an aggravated case of stomatitis, the gums swelling until the teeth are not visible, a sloughing off, and they are in such agony that it scarcely is possible to have anything touch the gum. The pictures you saw last night, shown by Dr. Nodine, only portrayed the sufferings of those in actual combat, but to hear the experience of some men who have been at the front, the suffering of those in actual combat is nothing compared to the suffering of the non-combatants. The atrocities and brutalities of this campaign are beyond description. We know of that terrible act, the sinking of the Lusitania, and of the deporting of the Belgians, of the shooting of thirty thousand Poles; but I heard not long ago a man describe his experiences in this awful campaign and tell what he saw, and that man was Ralph Connor, the great writer, author of "The Sky Pilot," "Glengarry School Days," "The Doctor," "The Prospector." In private life he is Rev. Dr. Gordon, of Winnipeg, Canada, and in the armies of France and Britain he is Major Gordon of the 43rd Cameron Highlanders. He went out among the first from Canada. Those of you who have kept in touch with this terrible war have heard of the Princess Pats and the 43rd. We have heard of the charge of the Light Brigade, but the percentage that came back from that charge was greater than the percentage that came back of the Princess Pat's in the fight of Neuve Chappelle. There is a little story told of the Cameron Highlanders. When they landed in France, the swirl of the pipes was heard in the streets of the French town and they marched to the tune of "The Cameron Men," the swinging of their kilts in unison—the French went crazy. While only a few miles across the channel, they never had seen a Scotch regiment, because the Scotch never had got that far south. There was great discussion among the people as to what kind of a regiment it was, and one little bunch of Frenchmen said, "They cannot be men; they wear ze dress." And they shrugged their shoulders. Then another group said, "They cannot be women; they wear ze mustachio." A wise old Frenchman hearing the discussion, said, "Ah, I know. They belong to that celebrated regiment we hear so much about—ze Middlesex regiment."

As Major Gordon told of the conditions he saw at that meeting—there were something like a thousand of Chicago's most representative men, the members of the Association of Commerce—and when he described the atrocities and the terrible conditions the non-combatants are subjected to, not a man of that thousand could trust himself to look into the eyes of another man or say a word, because our eyes were filled with tears and our voices were choked with emotion.

We are called to fight such atrocities, to bring to a settlement this awful war. And the sacrifices we must make are simply tremendous. You must not be satisfied with that one dollar contribution to the Red Cross, or your membership in the Preparedness League of American Dentists, nor with your Liberty Bonds, no matter whether it is fifty dollars or a thousand dollars, because you must make other sacrifices. You have no idea what the call will be, and to give you some idea of how this work is done in some cities, I will take for example the city of Toronto. They have an organization known as The Patriotic Fund. The soldiers get $33 a month from the government, and for any man who has a dependent, if he is married, the Patriotic Fund provides $20 extra, and $5 for each child in the family. So the soldier need not fear for the care of his dear ones at home. When the Patriotic Fund runs low they make great efforts to replenish the chest—and they have a thousand and one different funds, besides. It seems to me that every hour in the day there is a call made for help. With this great fund in particular, when it ran low ten months ago, an appeal was made and an effort to collect three million dollars in four days. At the close of the third day they had secured four million dollars. Seven and a half months later another call was made, and another campaign started to raise two million five hundred thousand dollars in three days. At the close of noon of the third day they had collected three million three hundred and fifty thousand. In the little city of Toronto of 600,000, in ten months the people gave seven million three hundred and fifty thousand dollars for one particular fund alone. Never in the history of the world has there been such a contribution, and if Canada and the little city of Toronto can do that, what should we expect of this rich America that is saturated with wealth, drunk with comfort, that has more wealth than all the rest of the world put together, resources equal to the rest of the world? And what Canada can do we can, we must do, and every man in this country must make up his mind that there is no sacrifice too great for him to make in behalf of our people who are fighting. There will be no effort spared in getting help to our boys we are sending to France to fight, not for trade or for territory but simply for human rights. We must expect many a call in the next few years, and I hope you will respond nobly and generously for no matter what sacrifice we make, it will be nothing compared to the sacrifices made by the men at the front. While we all must do our bit, yet any sacrifice we make will be nothing compared to the sacrifices of our women, and I am sure the American women will take their place with their allied sisters in any crisis that will come to the United States. The sacrifices being made by the women of the countries now at war, of Great Britain, Australia, New Zealand and Canada, and those to be made by the women of America, are of course, very great, but they are nothing compared to the sacrifices made by the women of France.

Our women have enjoyed all the fruits and comforts of a wealthy, happy and prosperous nation. But think of your sister in France! Hers has not been as prosperous, her life has not been as happy, for ever since 1871 the mothers of France have known that it was only a question of time when Germany would again invade France. Every night the mother of France could hear across the frontier the ring of the trip-hammer, she could see the glare of the blast furnace preparing instruments of war to subjugate and conquer fair France. When the little French boy came into the world, when the little babe first was held by the mother, she could not take the little child and say, "This is my baby—my boy—he will grow up some day to be a comfort to his mother;" but she could only look at him with her eyes full of tears and say, "You are a son of France; some day you will have to fight and die that France may live."

A few weeks ago I heard a lecture by one of the greatest educators in this country, Prof. Edward Steiner, of Grinell College. His subject was "The Trail of the Immigrant." No man is more competent to talk or knows more about our foreign population than he. He said, "These are the most momentous times in all history, and you and I are participants in them. The history of the world today is written in blood, the pages are pressed by the heavy wheels of artillery and the leaves are cut by the sword of war." He made an appeal to that Sunday evening club for all to be loyal, and his enthusiasm brought that whole audience to its feet and they shouted and cheered this man for at least five minutes. Edward Steiner was born and educated in Germany, but he has lived long enough in America to know what America stands for. I wish you could have heard his address.

What does America stand for in this hour of trial? What does Old Glory stand for, this red, white and blue? The red of the flag stands for the sacrifices we have made and will make, the white for purity of service and the purity of our ideals, and the blue for the sky over us and the stars to guide us. And in this conflict we should feel happy that we have as our allies two great countries that have the same symbols, whose flags when they flutter to the breeze stand for the same things—freedom, liberty and human rights. That is the tri-color of France, the Union Jack of Britain. So with Old Glory, the Tri-color and the old Union Jack we must go on with this terrible conflict, *so that the world may live,* and that you and your children's children may enjoy the happiness and freedom we are enjoying today.

When I think of these three flags I feel tonight that I have a great deal for which to be thankful. They are my Scotch ancestry, my Canadian birthright and my American citizenship. And I have a fourth reason to be thankful and proud, and that is my little Canadian wife, who today and for many days lately has not been as cheerful as usual, because she knows in a few days her only child will have to go to do his bit and his duty. The other night when I came home, how proud I was of her when she said to me, "Dad, if I had four or five sons I would give them all up because today I read President Wilson's speech"—and that was on flag day.

In this hour we must have no slackers, we must have none unpatriotic, no matter whether there flows through our veins the blood of Briton, Celt, Teuton, Slav or Gaul. They must have but one purpose and one thought, and that is loyalty to America. And they must be led by the loyal American who will lead on in fighting this great battle for freedom!

In conclusion, I pray that it may be said of the dental profession: "They knew their duty; when the call came for them to make their contribution, they made it," and there will be no reason for us to establish an alibi when the history of this great war is written.

FRIENDSHIP*

BY BURTON LEE THORPE, M.D., D.D.S., ST. LOUIS, MO.

TOASTMASTER: I now have the pleasure of introducing to you a man who needs no introduction, and yet I want to tell you that Burton Lee Thorpe, of St. Louis, is a man whom we may ask often, Who is he? He is a man who has been president of his state dental association, president of the National Dental Association; he was an organizer of the Fourth International Dental Congress—it was by his thought, effort and words that it existed. He is a man erudite, known in literature, one who is author of one of the greatest books of its kind ever written in either the medical or dental profession. He has gathered together the pictures and biographies and recited the works of hundreds of our men, from the earliest time away back yonder in the days of Fauchard, of France, down to the present time, such a work requiring days and nights of effort. It was printed a few years ago, a beautiful book, and interesting from lid to lid. It was published as Vol. II of "*The History of Dental Surgery in America*."

The late Dr. C. R. E. Koch compiled Volume I of this work and did a great work in writing of the histories of dental colleges, journals and societies, yet it was Dr. Thorpe who came nearest to us, because he wrote of men.

We now have the pleasure of listening to Dr. Thorpe, who will respond to the toast, "Friendship."

Mr. Toastmaster, Ladies and Gentlemen:

DID YOU EVER STOP TO THINK that the functions of a toastmaster and a full set of artificial teeth are synonymous—both are used to fill in the gaps between the jaws?

I am pleased that the toastmaster likes my book and glad his opinion of it was not like that of the clergyman's son, who, when asked what he thought of a wonderful sermon his father had preached, said, "I guess it was pretty good, but there were three mighty fine places where he could have stopped."

Seventeen years ago I attended my first meeting of the National Dental Association at Milwaukee, and there first met three cordial

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*Address at Golden Jubilee banquet, Tennessee State Dental Society, 1917.

Tennessee men with whom I formed a friendship that has lasted all these years.

These men made a great impression on me. I do not believe they thought so much of me for any ability I might have had, but they liked me because my wife was a Tennessee girl. And all of these years they have tolerated me and I have been quite content to pose as Mrs. Thorpe's husband. These men were the late Dr. J. Y. Crawford, who did more than any other one man in promoting me in the National Dental Association. Dr. L. G. Noel, genial friend and skillful operator and teacher, and Dr. Henry W. Morgan, a great educator and that fine son who has followed in the footsteps of his distinguished sire, who did so much in the early days, not only in this state but nationally in uplifting the profession.

Another dear friend whom I appreciate, God bless him, he has been a man, indeed, in every respect, is the present president of this society, who has held his hand firmly on the helm of this society for the past year and presided so gracefully and so fairly at this meeting. This man I refer to is my dear good friend, a great operator and teacher, who has done so much for dentistry both in Chicago and in the Nashville and Memphis dental colleges; I refer to Dr. David M. Cattell.

There is another artistic gentleman of Tennessee who has made a great impression upon me, and has always been an inspiration. A few weeks ago I heard a distinguished Italian clergyman from New York City relate an incident. He said when a boy, one morning before sunrise, he was sent with an old Italian peasant to mow a meadow. The meadow was covered with yellow poppies, and the old man leaned upon his scythe and shook his head and said, "Do I have to destroy this beautiful sight?" When I heard this story I thought of this man I have known all these years, not only for his artistic appreciation of nature and beauty, but also I have known him for the great contributions he has made to dental surgery and especially to peridontia, and for his executive ability. I refer to Dr. J. D. Towner.

I have known these men and many others of Tennessee who have exemplified that fine friendship and always when you go to their home, that beautiful hospitality that the men and women of Tennessee are noted for. If you have not been the guest at the hospitable homes of Dr. and Mrs. Crawford, Dr. and Mrs. Noel, Dr. and Mrs. Morgan, Dr. and Mrs. Cattell, Dr. and Mrs. Towner, Drs. Stanley and Celia Rich, and met their charming families as I have, you have missed a treat, I assure you.

In my associations with Tennesseeians, never have I found a man or woman who had a Prussian thought or possessed a von Hindenburg trait. They always have been kind and hospitable and it always is my pleasure to come down here, away from the clamor of the anvil chorus of St. Louis, to listen to the sweet song of the orioles and bask in the warm sunshine of your friendship.

If you haven't read the cleverest story the European war has brought forth you should. It is a beautiful story by Mary Stillman Andrews, entitled "*Three Things*." It tells the story of a rich young American who has snobbish ideas of race prejudice, caste and religion. He goes to France to fight for the Allies and is wounded in battle, and lying on the battlefield he sees coming out of a far-distant cloud of smoke and dust, a tall, sad-faced, hook-nosed old man, clad in a black cassock with a black cap covering his white hair. This old Rabbi is wandering among the wounded, peering into faces, trying to find men of his own race to help. He comes across a wounded Irishman. The Irishman cries, "Water, water," and the old Rabbi bends down and lifts this man's head and holds a flask to his lips. The eyes of the dying Irishman made no fine distinctions; seeing the black cassock he thought its wearer was a priest of his holy faith. He whispered, "Crucifix! Father, Crucifix!" The old Rabbi started, but from somewhere, somehow, he held forth an object and placed to the dying man's lips, a sign of a faith not his own. Just then another shell burst and the old Rabbi fell dead, the dead Irishman's head on his breast and in his hand was clasped the cross of Christ. Illustrating that in death all faiths are the same, and the greatest of them all is Love.

Have you ever stopped to think, and ask yourself, "Am I my brother's keeper?" Better than this, my dear friends and fellows, have you ever stopped to think that *I am my brother's brother*? To me many of you have been that, indeed, and God bless you, I thank you for the great kindness and friendship you always have shown me.

Local Exemption Boards

The government probably will appoint at least one dentist on every Local Exemption Board in the country. If League members would serve on these boards, it would greatly facilitate the League's work, as in most cases the conscripted men could be directed at once as to where he could have his dental defects treated. Therefore, Directors of States are urged to scrutinize all appointments to Local Exemption Boards, and to enroll all non-members within our ranks as rapidly as possible. It is desirable to appeal to the Adjutant General of your state and urge him to secure nomination for these boards through the presidents and officers of Local Boards.

—R. OTTOLENGUI, *Pub. Com.*

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.)

Dakin's Solution in Dentistry

I wish to call attention of the dentist to Dakin's solution. This wonderful antiseptic, which has revolutionized the treatment of wounds in the war hospitals of France and England, first suggested by Dr. H. D. Dakin, of the Rockefeller Institute, is just as invaluable in dental practice as it is to the general surgeons. In dental surgery for post-operative irrigations and dressings, for irrigating pyorrhea pockets and sterilizing root canals, it has no equal. I say this after several months' trial.

Formula for Dakin's solution: Chlorid of lime, 200 grams; soda carbonate, 100 grams; soda bicarbonate, 80 grams; acqua pura, 10 liters. Allow to stand over night and filter through cotton. This makes a little over 21 pints. Does not deteriorate by standing.

In treating root canals, after the canal is well opened through the apex, irrigate with Dakin's solution and seal a Gillett absorbent point, wet with the solution, in the canal for several days. This is done with the rubber dam in place. Repeat as often as indicated. Dakin's solution sterilizes by liberating chlorin, which has strong antiseptic properties, and by irritation induces hyperemia. I mentioned some time ago in this magazine that hyperemia, to my mind, was the most potent agent in ionization. I am gratified to observe other investigators recognizing this fact. With Dakin's solution we get both chlorin and hyperemia, and so the patient does his ionization at home instead of in the dental chair, if I may put it that way.

—*H. J. Kauffer, Journal Allied Dental Societies.*

Another Place for Synthetic

Decay at cervical margin had created quite a large cavity slightly under the gum and under the margin of a cuspid gold crown which was supporting a large bridge, otherwise in seemingly good condition. All decay was removed, overlapping gum tissue touched with an acid to prevent weeping into filling material and synthetic built in flush with all margins and finished in the usual manner.

—*S. A. Allen, Nebraska Dental Journal.*

Finishing a Cast

In the act of polishing we can easily destroy the result of our effort so far, therefore the utmost care must be taken not to dull or polish away the margins. After the cast is ready for the lathe, use tripoli to remove the scratches; after this is done transfer to the rouge buffer and polish. For the final polish which will add luster, give it the acid polish. To accomplish this place the cast over the flame until cherry-red hot, plunge into hydrochloric acid, wash, dry, repolish lightly on the rouge buffer. Grooves and pits can be effectively polished with a proper-sized bud bur in the engine run backwards.—*W. E. Mathison, Dental Review.*

Artery Forceps

An instrument which I have found exceedingly useful in routine practice is a pair of artery forceps, though I do not use them for the purpose for which they were designed. It is an instrument about six inches long, so fashioned that when the beaks are brought together they may be locked and anything grasped by them cannot be pulled out. Occasionally a patient presents with a quill of the tooth brush or a piece of silk caught between the teeth in such a way that it cannot be grasped by the fingers, and so wedged that the cotton pliers cannot dislodge it. In such cases the artery forceps are a real blessing. Also for grasping and removing the ligatures used in tying the rubber dam, the braided silk now so generally used for wedging teeth, the little wire bristles placed in roots before X-raying, etc. It may not be needed for any of these uses once a week, but there always comes a time when it is worth its weight in gold. It can be had of any surgical supply house at a trifling cost.—*A. H. Merritt, Dental Register.*

Dental Defects

Perhaps the most striking example of the excellent results of school dental treatment is shown in the steady reduction in the number of Toronto scholars suffering dental defects. Statistics gathered from many widely-separated points show that in the average community the percentage of school children with dental defects ranges from 85 per cent. to 95 per cent. In the city of Toronto, just previous to the organization of school clinics, 95 per cent. of children comprising Church and Elizabeth-street schools were found to be afflicted with dental trouble. Subsequently, in 1915, examination of the scholars in 86 schools showed that the percentage of children with dental defects had been reduced to 65 per cent. This percentage, covering all the schools in the city, has now been actually reduced to 51 per cent. It is doubtful if any other city of equal size can show such favorable conditions in this regard as does Toronto. Forty-nine children in 100 are absolutely free from dental defects, exclusive of cases of irregularity of teeth.—*Wallace Seccombe, Oral Health.*

To Prevent Distortion of Wax Bites for Bridges

Run up bite in plaster or artificial stone. Allow it to harden thoroughly before attempting to adjust to cast.

—*Victor H. Fuqua, Chicago, Ill., Dental Review.*

Casting

To make certain that gold will adhere to posts (especially composition), flow a little 24-karat gold, by means of blowpipe, where you wish the gold to adhere, then wax up and cast in usual way.

—*R. F. Mathews, Haberfield, N.S.W.,*
Commonwealth Dental Review.

Patched Fillings

Of all things that are productive of bad results, I believe the greatest is patching. I firmly believe that ninety per cent. of all the patching of faulty fillings, bad crowns and other defective operations are the forerunners of future trouble, many of which result in the loss of the pulp.—*Fred W. Gethro, Dental Review.*

Curette After Extracting

We have had many patients wearing full upper and lower dentures who were suffering from arthritis have their jaws X-rayed and we have found focal infection present. Following the surgical curettment of such crypts these patients have been permanently relieved of such sequellæ. This proves that the extraction of abscessed teeth without the currettment of the pyogenous membrane will not eradicate oral foci of infection.—*Carl D. Lucas, Dental Items of Interest.*

Requirements of the Dowel

First: It should conform to the anatomical form of the root canal.

Second: It should fit closely to the walls of the canal throughout its entire length.

Third: It should extend into the canal a depth equal to the length of the crown to be restored.

Fourth: It should possess enough strength to withstand the stress to which it will be subjected.

Fifth: It should be constructed of a material that will not corrode or disintegrate from the action of cements or fluids of the mouth.

As the dowel assumes the greater portion of the stress to which the crown will be subjected, the alloy of platinum and iridium or gold and platinum generally are used, because of its toughness and strength. (The former preferred.) The round and square wire in sizes varying from 12 to 18-gauge are prepared for this purpose.

—*I. H. Ante, Oral Health.*

Salt Solution as a Neutralizing Agent

Recently my nurse, in handing me a bottle of silver nitrate, saturated solution, spilled a considerable portion of it in my hands. In order to neutralize the cauterizing effect, I washed my hands in a saturated salt solution. I was much surprised to find that my hands did not discolor. Try it next time.

—Dr. W. M. Wadleigh, San Francisco, Pacific Dental Gazette.

Use of Mouth Lamp

The use of the mouth lamp in case of general examination for illumination of the oral cavity and its value in showing cavities, tartar, mucous patches and various conditions so frequently found at the gingival margin is, I believe, very generally neglected or not realized, and I urge you to watch and see in how many ways the mouth lamp will aid in your work. These lamps have a neglected field of usefulness for inspecting the area and locating fragments of roots which have been left buried in the jaw where the thickness of the tissues does not preclude the penetrating rays of light from performing their function.

—A. C. Wherry, Dental Items of Interest.

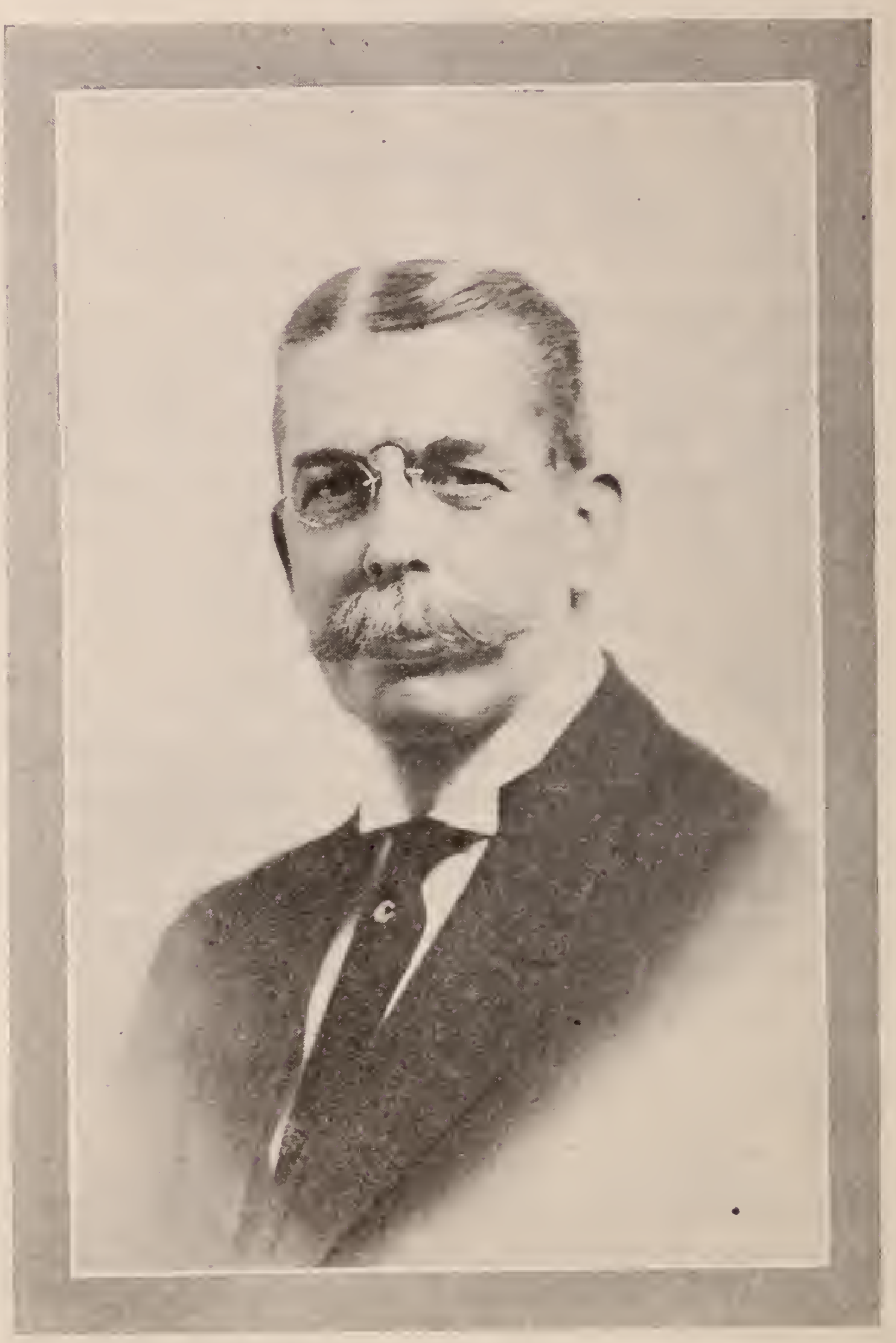
X-Ray Mistakes

I believe it is absolutely essential to satisfactory reading of X-rays to have a good working knowledge of the histology and anatomy of the parts examined. It is self evident that no man can make a reliable reading unless he has a good working knowledge of the normal minute and gross construction of the parts examined. Common errors are to mistake the antrum, mental foramen, nasal cavity, inferior canal, photo defects, etc., for pathological conditions.

—R. J. Wenker, Dental Review.

"Cure-All" Orthodontic Appliances

Orthodontia is far too serious a matter to be lightly undertaken by those who are not thoroughly trained in the fundamental principles underlying its proper performance. Yet it is of common occurrence for dentists to attempt the handling of orthodontic cases, who through flattering advertisements, by trade houses and mechanical laboratories, are led to believe that the correction of malocclusion and dento-facial deformities are free from perplexities upon the purchasing of certain appliances that are constructed, patented and endorsed by some famous orthodontic wizard. I do not know of anything that is more vicious than this so-called patented cure-all appliance to undermine the progress of scientific orthodontia and degenerate it with a trade or sleight-of-hand performance.—*M. N. Federspiel, Dental Items of Interest.*



Dr. John Ross Callahan

OBITUARY

DR. JOHN ROSS CALLAHAN

DR. JOHN R. CALLAHAN, one of the best known dentists in the country, died Tuesday night, February 12th, 1918, at the Queen City Club, Cincinnati, Ohio. He had been active in his office during the day, and in the evening had gone to his club, where he started a manuscript describing some of his research work. Upon retiring he sought relaxation for his unusually active mind by reading a book. Apparently he closed the volume as he fell into a sleep from which he never awoke. A stroke of apoplexy ended his life as he slept.

Doctor Callahan was born in June, 1852, his father, Dr. Dennis Callahan, being a physician and dentist at Hillsboro, Ohio. He was graduated from the Philadelphia College of Dental Surgery in 1877, and started in practice in San Francisco the same year, but returned to Hillsboro, Ohio, in 1879, and practiced there about a year. He then moved to Cincinnati, where he practiced his profession up to the time of his death.

He always was active in national, state and local dental society work and contributed extensively to dental literature. He was president of the Ohio State Dental Society in 1891, having previously served seven years as secretary. He was president of the Cincinnati Dental Society 1906 and 1907.

He always had done a great deal of research work, and during the past two years had devoted all of his spare time to investigations. Dr. Callahan was at the head of the dental department of the Cincinnati General Hospital, and Director of Research, Cincinnati Dental Research Club. At Rochester, N. Y., in May, 1917, he was given the Jarvie medal for his scientific investigations.

The following editorial was published in the *Cincinnati Times-Star*, February 13th, 1918:

"The death of Dr. John R. Callahan is a great loss to dental science. Dr. Callahan's professional activities took him far beyond the routine of his practice. He labored for the general advancement of his profession and had no small share in widening the scope of dentistry until it became one of the important factors in general diagnostics. From his laboratory came many contributions to dental science, the harvest of experimentation as unselfish as valuable. The scientific imagination was one of Dr. Callahan's attributes, the ability to see beyond the immediate causes into the causes of causes, to trace symptoms to their source instead of being satisfied with superficial manifestations.

"There is something heroic about a professional career that so quietly contributes to the general good of humanity. There is no perfervid appeal to 'the peepul' to recognize service in their behalf. The emoluments are in no sense commensurate with the achievements. The effort finds its reward largely in the effort itself and in its scientific fruition. Any praise from the outside world comes largely from the few possessed of the special knowledge that equips them for appreciation.

"Such was Dr. Callahan's career—the unselfish labor of a scientist in humanity's behalf. He worked hard, accomplished much and received his meed of praise from those familiar with his achievements. The greatest tragedy of his death lies in the things that he would still have accomplished and which he was forced to relinquish to other heads and hands."

Dr. Callahan was an ardent life member of Delta Sigma Delta Fraternity, and an honorary member of many state and local dental societies. He was married in 1880, and is survived by a wife, two daughters and one son.

The funeral was held at the chapel of the Cincinnati Crematory, on Friday, February 15th. The pallbearers were Drs. E. H. Pendleton, T. Irving Way, B. W. Foley, Frank A. Hunter, A. B. Thrasher, Wm. H. Taggart, H. E. Germann and E. E. Hall.

Honorary pallbearers representing various societies: National Dental Research, Dr. Weston A. Price; National Dental Association, Dr. L. E. Custer; Ohio State Dental Society, Dr. Z. N. Wright; Indiana State Dental Society, Dr. Carl D. Lucas; Cincinnati Dental Society, Dr. Walter P. Stewart; Cincinnati Academy of Medicine, Dr. J. H. Landis; Cincinnati General Hospital, Dr. A. C. Bochmeyer; University of Cincinnati, Dr. E. W. Dabney; Cincinnati Dental Research Club, Dr. C. Stanley Smith; Delta Sigma Delta Fraternity, Dr. C. P. Sweny.

Doctor J. R. Callahan's Research Laboratory in the Dental Department of the Cincinnati General Hospital

SOCIETY·ANNOUNCEMENTS

Columbus Dental

The Columbus Dental Society will hold its annual meeting at the New Southern Hotel, Saturday, April 27th. This will be an all-day and evening meeting, with interesting papers, clinics and exhibits. The program will be announced in the April Summary. This is a preliminary notice that you are invited, so mark off the date, as you will want to be there, and a cordial welcome will await you.

J. M. Henderson, *Pres.*
Edward C. Mills, *Chairman.*

Indiana State Board

Next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, June 17-22, inclusive. Applications and other information may be obtained by addressing H. C. McKittrick, Secretary, Indianapolis, Ind.

Michigan State

The sixty-second annual meeting of the Michigan State Dental Society will be held at the Hotel Statler, Detroit, week of April 8-13, 1918. The regular meeting will be held on April 8th and 9th, with a splendid program. The remainder of the week will be a post-graduate meeting in charge of the Detroit Club Clinic, at which every important branch of dentistry will be covered.

C. G. Bates, *Secy.*,
Durand, Mich.

Kentucky State Dental Association

The next annual meeting of the Kentucky State Dental Association will be held at Lexington, Ky., June 13-14-15, 1918. An "amalgam program of special interest." Address all corresponcence to Dr. W. M. Randall, Secy., Louisville, Ky.

Iowa State

The fifty-sixth annual meeting of the Iowa State Dental Society will be held in Des Moines, Ia., May 7-8-9, 1918. An excellent program has been prepared, including seminars, papers and clinics. A cordial invitation is extended ethical members of the profession from out of state to attend any or all of these sessions.

E. R. Swank, *Secy.*,
Panora, Ia.

Illinois State

The fifty-fourth annual meeting of the Illinois State Dental Society will be held at Bloomington, Ill., May 14-15-16-17, 1918.

J. P. LUTHRINGER, *Secy.*

Odontological Society of Western Pennsylvania

The thirty-seventh annual meeting of the Odontological Society of Western Pennsylvania will be held in the Hotel Chatam, Penn Avenue and Fourth street, Pittsburgh, Pa., Tuesday and Wednesday, April 9th and 10th, 1918.

The program committee promises one of the best dental meetings ever held; men of note will read papers of interest to the twentieth-century dentist. The clinics will be given by the study clubs of Western Pennsylvania and will be of interest to one and all. Exhibitors will be amply accommodated with space by addressing Dr. Leslie Waddill, Jenkins Arcade Building, Pittsburgh, Pa.

719 Jenkins Bldg., Pittsburgh, Pa. KING S. PERRY, *Secretary.*

West Virginia State Board

The annual examination of candidates for license to practice in the state of West Virginia will be held at Parkersburg, W. Va., June 25, 26 and 27, 1918. Blanks and information will be furnished on application to the undersigned.

H. H. SMALLRIDGE, *Secretary.*

North Carolina Society

The forty-fourth annual meeting of the North Carolina Dental Society will be held in Wilmington, N. C., June 19-21, 1918. Headquarters, Oceanic Hotel. W. T. MARTIN, *Secy.*

South Carolina State Board

The annual meeting of the Board of Dental Examiners in the state of South Carolina will be held at The Jefferson, Columbia, S. C., beginning promptly at 9:00 o'clock, Monday morning, June 24th, 1918. All applications must be in the hands of the secretary by June 14th. Application blanks and full information may be obtained by addressing

R. L. SPENCER, *Secretary,*
Bennettsville, S. C.

The Texas State Dental Society

The thirty-eighth annual convention of the Texas State Dental Society will be held at San Antonio, Texas, the famous City of the Alamo, April 10, 11, 12, 1918. Members of other state societies are cordially invited to attend. J. G. FIFE, *Secy.*

736 Wilson Bldg., Dallas, Texas.

NATIONAL DENTAL ASSOCIATION ANNOUNCEMENTS

As previously announced, the 1918 meeting of the National Dental Association will be held in Chicago the first week in August. The House of Delegates and the Board of Trustees will meet Monday, August 5th, and the meeting proper will begin Tuesday morning and close Friday noon.

During the holidays Major Logan was in Chicago and completed arrangements for holding the entire meeting—all sessions, clinics, exhibits *et al* at the Auditorium and Congress Hotels, Michigan avenue and Congress street. These hotels are connected by a large underground tunnel running under Congress street. The commodious quarters of these hotels, located and connected as they are, afford just such a meeting place as Major Logan would have made "to order" had he planned this space himself. Those who are intimately acquainted with the president know what this means.

The various committees now have been appointed, and with the section officers are steadily at work to the end that no detail will be overlooked which would in any way add to the success of this meeting. That the meeting may be truly representative of the National, the General Clinic Committee has directed a letter to the presidents of the various state societies asking for at least two clinicians. So far as is practicable the same idea will be carried out in the program for the various sections. Among the important features will be the unveiling of the monument to the late Dr. G. V. Black. The sketch has been drawn and accepted and every practicing dentist owes it to himself and to his profession to be present on this memorable occasion.

Hotel reservations should be made at once.

J. P. Buckley, *Chairman, Pub. Com.*

American Institute of Dental Teachers

At the last annual meeting of the American Institute of Dental Teachers, held at Pittsburgh, Pa., January 29-31, 1918, the following officers were elected: President, A. W. Thornton, McGill University, Department of Dentistry, Montreal, Que.; vice-president, R. W. Bunting, Ann Arbor, Mich.; secretary-treasurer, Abram Hoffman, 381 Linwood avenue, Buffalo, N. Y.; executive board, A. D. Black, Chicago, Ill., G. S. Millberry, San Francisco, Cal., and A. H. Hipple, Omaha, Neb.

The next annual meeting will be held January 28, 29 and 30, 1919. The place of meeting will be announced later.

Dental Library Association

Believing that one of the most important functions of a dental library is the interchange and exchange of dental books and journals, it has been thought advisable by a great many dental librarians to form a Dental Library Association, similar to the Medical Library Association.

Object: The fostering of dental libraries and the maintenance of a system for exchange of dental literature and duplicates; securing and distributing the transactions of dental societies.

Membership: Any dental society, association, university, college or library, having a fixed home and a dental library; any individual interested in dental literature or libraries.

Benefits: The banding together of a united body with a common cause. The betterment of conditions in dental libraries. A clearing house through which books, journals, reprints, or lists of these, may be sent from one library to another.

We desire to know what libraries now exist and how many would be interested in the formation of such a society.

B. W. Weinberger, *Librarian,*
First Dist. Dental Soc. N. Y. Academy of
Medicine, or 40 E. 41st St., New York City.

Preparedness League of American Dentists

Notes and News of Importance

NEW MEMBERS

The treasurer, Dr. L. M. Waugh, reports a most satisfactory response to the circular letter recently sent out as a means of recruiting members. A careful tabulation has shown that prior to January 1, 1918, there were, in round numbers, 5,700 members of the League. Up to February 1st, in response to the circular letter above mentioned, 4,900 new members have been enrolled, and Dr. Waugh reports that applications for membership have come in so rapidly, about a hundred a day, that as yet it has been impossible to classify by states. This will be reported next month.

THE LEAGUE BUTTON

By a recently made rule, the buttons are to be sent to new members without extra charge. (Old members can get the button for 25c.) Therefore, members will please do two things: Get your button; *wear your button.* You are asked to wear it, not to advertise yourself, nor the League, but we want to make the man without a button conspicuous.

In France, within thirty days after the beginning of the war, all persons serving the government—soldiers, hostlers, drivers, railroad men, and labor of all kinds, skilled or unskilled—wore arm bands reading "Military Service." Men without bands became very conspicuous and received scant consideration from the "Women of France." Wear your League button!

All dentists who have not yet filled out Form 3A are requested to do so at once and mail the same to Lieut. Heckard.

DENTAL ANESTHETISTS WANTED

My Dear Dr. Ash:

I am just in receipt of one of your circulars of the Preparedness League of American Dentists, and would sign up and return cards, only I am a physician and surgeon and I am furthermore disabled with arthritis from actively participating in your efforts.

However, despite my disability and the limitations of a wheel-chair, I am co-operating with the Surgeon General and Council of National Defense in recruiting expert anesthetists for immediate service at the front in the base hospitals and casualty clearing stations.

In this recruiting we have not drawn any lines between the surgical and dental anesthetist, believing that both are fully competent for this service. The Interstate Association of Anesthetists, of which I am secretary, has welded the interests of the medical and dental professions so thoroughly that recently in Ohio our Attorney General, in an opinion, delegated equal privileges to medical and dental anesthetists. We are anxious to have the verdict of the war hospitals indorse this amalgamation.

It has been with some difficulty that we have persuaded the Surgeon General that anesthetists, surgical and dental, are in great demand at the front. To emphasize their value, Capt. Gwathmey, of the Lakeside Unit, while loaned to the British army, during the attack on the Messines Ridge, kept three surgeons busy and standing at the head of three tables, radiating like spokes of a wheel, put 34 wounded soldiers under anesthesia during a period of five and one-half hours. Truly a record, and showing what the expert anesthetist can do in limiting the horrors of war.

The German, French and even the English anesthetic service collapsed promptly at the outset of the war, and thousands of wounded were operated on without anesthesia, agents and administrators both being lacking. We are trying to avoid such a collapse of our surgical and dental service.

In this connection, if in your canvass you encounter any dental anesthetists who desire active service, or who will accept anesthetic service at base hospitals at home, or are competent to act as instructors, or in replacing those in hospitals who have lost staff anesthetists to active service, let me have their names and addresses and I will try and see that they are given their chance of doing their bit.

Appreciating the efforts you are making and wishing you every success, I remain,
Cordially yours,

Avon Lake, Ohio.
F. H. McMechan.

THE NEW SAVINGS STAMPS

"Money on call with the United States government" is the accurate description given of the new War Savings Stamps by Frank A. Vanderlip, the eminent New York banker, who is serving at the head of the national organization which is handling them on behalf of the treasury department. Money on call draws interest but may be taken back by the owner from the borrower whenever he desires.

You lend $4.12 to the government and can get your money back on ten days' written notice. Interest of one cent a month is then paid on the $4.12 that you lent.

But, if having lent, you wait till the stamp matures on January 1, 1923, you get $5 for it. That is 4 per cent. compounded four times a year. The second Liberty Bonds and the convertibles of the first Liberty Bonds pay 4 per cent., but you have to compound it yourself, and you can't do it quarterly because the interest is paid you only twice a year. Still, this interest invested in War Savings Stamps, can be put to work at the swifter gait.

A Liberty Bond's value fluctuates slightly. A War Savings Stamp's value at any date is printed on it and fixed by law. Not only does the law say that this value shall always grow greater, and may never grow less, but the government makes the law a fact instead of a flat undertaking to pay the value printed on the stamp. If you lost a coupon-bearing Liberty Bond, you are in danger of losing the principal and interest. It's a good deal like dropping a $50 bill in the street. If you lose a War Savings Certificate with one or more War Savings Stamps on it, the finder cannot cash it without committing forgery by indorsing your name on it, a highly penal offense, the perpetrator of which is easily caught. If the finder is honest, all he has to do is to drop the certificate into the nearest letter box. It bears your name and address.

A War Savings Certificate can be registered, if you wish. This provides the ultimate safeguard, but may be less convenient if you have to cash it, as a registered certificate can be redeemed only at the post office that registered it.

It isn't necessary to buy a $4.12 War Savings Stamp outright. Buy thrift stamps at 25 cents each. Sixteen of these, plus 12 cents from the change in your pocket—this applied to a conversion in December, 1917, or January, 1918, and one cent additional for each month thereafter—are convertible into a War Savings Stamp at any time and almost anywhere you may happen to be.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVIII April, 1918 No. 4

We Publish the Proceedings of the Following Societies:

The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
Iowa State Dental Society
Texas State Dental Society
Tennessee State Dental Society
Section on Stomatology—American Medical Association
Interstate Association of Anesthetists
and Several Local Dental Societies

Editorial Office: 195 16th Avenue, Columbus, Ohio
L. P. BETHEL, M.D., D.D.S., Editor-in-Chief

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Neither the editor nor publisher is responsible for the views expressed by authors in the reading matter published by THE DENTAL SUMMARY

REGULAR CONTRIBUTIONS

ROOT-CANAL THERAPEUTICS, SANE AND INSANE*

BY W. G. EBERSOLE, M.D., D.D.S.

ROOT-CANAL TREATMENT AND FILLING WITH THE FRILLS AND FURBELOWS ELIMINATED

IN SELECTING the title of this paper as "Root-Canal Therapeutics, Sane and Insane," we did so because we could think of no other title that would permit the expression of our conception of the status of root-canal therapy as it exists at the present, and at the same time offer us an opportunity to put forth a strong plea for the correction of a faulty condition on a basis which would bring peace and comfort to many a struggling dentist and trusting patient.

We might better have written our title, "Root-Canal Therapeutics, Insane and Sane," for we shall discuss the subject in that sequence.

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*Read before the Cleveland Dental Society, February 4, 1918.

We selected the word "insane" because we know of no word that would so well express the wild, wandering, irrational lines of procedure which are being practiced at present as root-canal therapeutics by the dental profession of this country.

We have selected the word "sane" because we hope that by the time we have finished our paper and the subsequent discussion we will so thoroughly disillusionize the minds of some of our members that we will be able to adopt a line of procedure in root-canal therapeutics that will rest on a sober, sound and rational basis.

In other words, my fellow members, the present state of mind of most members of the dental profession will have to be very materially changed before we can adopt a line of procedure in root-canal therapy that will give both nature and our patients a square deal.

We want to say to you members of the Cleveland society, and through the publication of this paper, to all members of the dental profession, that no man can realize more fully than we do the responsibility and obligation entailed in attempting to bring cosmic order and harmony out of the chaotic jumble that exists in the practice of root-canal therapeutics today.

We know, as few men can know, what effort must be put forth and what price must be paid before one can hope to lead the thoughts of the dental profession to a higher plane, and cause them to flow in a new direction and along new lines.

But once before, in our experience with dentistry and the dental profession, have we felt the keen necessity of applying drastic measures in order to awaken the profession to its full responsibility to humanity, and that was when, after ten years of constant effort to teach the profession the value and importance of mouth hygiene as a health measure, without practical results, we decided to educate the dentist through educating the public; and as chairman of the Oral Hygiene committee of the National Dental Association, we started the great National Mouth Hygiene Campaign a few years ago.

Today we are face to face with a great crisis in dentistry, and for the second time in our career we feel that drastic measures must be employed before a safe and sane line of procedure can be secured which will bring to our patients that class of dentistry which means health, strength and comfort; and we are, therefore, undertaking this work, inspired by the same motives and principles which prompted our national mouth hygiene activities, and that is one of service and benefit, both to the profession and humanity.

In presenting this paper to you tonight, we are doing so at a time when it seems that some of our research workers have done, or are doing, their utmost not only to destroy the confidence of the dentists in the value and worth of their own services, but have employed almost every method and means possible to shake the confidence of the profession in the physiological laws which govern the human body and enable nature, through reconstruction and compensation, to overcome pathological and surgical interferences.

We come to you with this paper at a time when both the dental profession and nature need a conservative man to plead the cause of truth and justice. We presume that our attempting to assume the conservative role amuses some of you as much as it does us, when we think back six or seven years, when we were considered by many, many members of the profession as not only extremely radical, but as very likely to bring the profession into disrepute by the "extravagance" of the statements and claims made in connection with the importance of mouth hygiene.

The irony of fate is that today some of the research workers who are the most extravagant in their statements as to the part that diseased teeth and roots occupy as related to health and disease, are some of the very men who were the most pronounced in the criticism and censorship of our activities.

A very prominent dentist of Minneapolis withdrew his application for membership in the National Mouth Hygiene Association because he disapproved of some of the "extravagant" statements contained in literature for which we, as secretary-treasurer general, were responsible; but strange as it may seem, that man, as one of the foremost dental research workers of the country, has done and is doing more to prove the soundness of the statements we made years ago than any other man in the dental profession. In fact, the findings of this research worker have proven the correctness of our conclusions and clinical observations; but the strange part is that some of the statements made and conclusions drawn by this man from his research work are so "immoderate" when compared to those we made that we feel that we can safely be classed as a conservative at this late date.

Strange how fate works, is it not, when the radicalist of yesterday becomes the conservative of today, and the conservative of yesterday the radicalist of today? God alone knows what tomorrow may bring!

It is only a few years since one of our members stood before this society and attributed the areas of rarefaction that he found at the end of many devitalized teeth to the use of arsenic in the destruction of the pulp, and succeeded in frightening most men in the profession into the belief that in the use of arsenic they were guilty of causing irreparable damage at the ends of roots.

Today, and for some time past, the same gentleman and some of those associated with him in research work, have been and are painting such pictures of the conditions at the end of pulpless teeth and the disastrous systemic results of these conditions, and have used and are using a propaganda of such a startling and alarming character that a very large percentage of the dental profession of this country have been frightened into a regular state of hysteria.

We believe that it is well that the profession should receive just such a jolt. The unfortunate part of it is that some of the men who need fright the most have not been touched, while many of the safest and sanest men in the profession have been so startled and have had their confidence so shaken that they are almost if not entirely afraid to fill the root or roots of any pulpless tooth.

We must either extract all pulpless teeth and destroy the grinding powers of the human mouth or we must agree that it is safe to fill most pulpless teeth, and then adopt a standard method of treating them, and it is for a sane consideration of this matter than I am pleading tonight.

We are up against the proposition of either doing something or doing nothing, and of doing it *now*. We cannot wait till our Research Institute educates research workers who will be able to solve the problems that confront us in ascertaining the exact extent to which nature will tolerate pathological or surgical interference with tooth structure, and then wait till they solve the problems after they have been so educated.

For we say to you that from the statement that the areas of rarefaction at the apices of roots of pulpless teeth were due to the destructive activities of arsenic, to the proof that these areas of rarefaction are focal areas of infection and are responsible for grave pathological conditions in remote parts of the human organism, is a long, long stride, indeed; but the distance that remains to be traveled is so much, so very much greater than that already traveled, that it will be a long, long time at the rate we have been going for four or five years, before our research workers will be able to understand the true application of human physiological activities in compensation for, or protection against, pathological or surgical interference.

After years of careful study we have become thoroughly convinced that it is not only safe to save all teeth when the roots can be successfully filled, but that the best interest of humanity demands that we save these teeth, and we are not willing to wait years to be told what we may or may not do with safety.

We know that it is practically impossible to sterilize all the tissue surrounding the apical end of diseased roots, and we have watched with a great deal of interest the frantic efforts that have been made and are being made by some of our research workers to sterilize this region; and we want to say to you at this time that our knowledge of physiology and pathology gained as students in college and in twenty years of very active practice, coupled with practically eight years of actual experience as a personal battlefield for these great warring forces, compel us to proclaim our belief that we, as dentists, are being misled into the belief that we must attempt to perform for the human body, through the employment of mechanical, chemical, electrical and surgical means, many of the functions for which nature is a thousand, thousand times better equipped to perform for herself, with infinitely better results, if we will but cease our interference.

We believe, and believe as firmly as we believe anything, that many of the deductions and conclusions formulated in advocacy of interference beyond the immediate end of the root are not only at fault but that many times those who attempt to follow the suggestions which have been based upon these deductions or conclusions, are not only outraging nature, but are doing both the profession and humanity a great injustice. It is our most positive belief that nature not only does not require our assistance in sterilizing the tissues beyond the apical end of the root, but absolutely resents our attempts.

Before proceeding further we desire to digress long enough to state that the best possible kind of root-canal therapeutics that can be practiced is the preventive kind, that kind which begins before a cavity in a tooth occurs.

In other words, we want to impress upon you people here the fact that we always have believed, still believe, and always will believe that the teaching and the practice of preventive dentistry is the most important obligation that rests upon the dental profession. It stands second to nothing in all the realm of dentistry. We are sorry to say, however, that at least nine-tenths of the members of the profession in actual practice give "reparative dentistry" first thought and consideration. We regret to say also that the men who are giving first consideration to reparative dentistry are, with but few exceptions, giving root-canal treatment or therapy the least consideration of any part of that line of practice.

We are not prepared to say, or at least we are not going to say, that in the field of reparative dentistry, root-canal therapeutics is the most vital in its importance; but we are prepared to make some statements which we trust will command and hold your attention with sufficient tenacity to lead you to aid in correcting some of the evils which exist. There is nothing to be gained by generalities in what we have to say; therefore we propose to be specific and confine our statements to local activities and conditions existing in this immediate vicinity.

If the findings of our research workers are true, and I feel that most of you think they are, then we must concede that because the members of this society, the Cleveland Dental Society, did not know, realize or understand the true value or importance of root-canal therapeutics, thousands of Cleveland former citizens are sleeping the sleep from which there is no awakening, and other thousands are enduring lives of misery and inefficiency because of faulty root-canal therapeutics, and still other thousands of Cleveland's population are traveling in the footsteps of those who have gone before.

For the things that are passed and which happened because we did not know the danger, or how to prevent existing conditions, we cannot be held responsible either in our own conscience or in the consciences of others.

Thus far I have written in the first person, plural; from this on, it suits my purpose best to write in the first person, singular.

Before leaving the subject and launching into the practical part of this paper, I want to get the idea firmly fixed in the minds of each one present that what I have to say is addressed to each individual. I don't want any member present to get the idea into his head that what I have to say does not include him, but is addressed to his neighbor.

There is not a man or woman within the sound of my voice who has been in practice five years but has had patients who are in at least two of the three classes mentioned; and there is not a member who has been in practice ten years who does not have or has not had patients belonging to each of the three groups mentioned above.

If there is any man in the audience who thinks his work so perfect and so free from fault that he cannot be classed with the rest of us, I want to say, "God help that man's patients," for the chances are that he of all men needs most to take home that which is said tonight.

I will say further that if he is a man of any prominence and has been in practice for a period of ten years or longer, I think my cabinet files will contain some record of his work which, in the light of what we now know, will take some of the egotism out of his makeup.

I have come, however, not to criticise or find fault with errors of the past, but to criticise and condemn some things that are being done in the present for which there can be no satisfactory excuse offered to suffering humanity; and I come to beg for such action by this society as will rectify the faults of the present and fortify us against their repetition in the future.

Fellow members of the Cleveland Dental Society, there is not a dentist in this room tonight, myself included, who is doing anything like as good root-canal work as he or she might do. This is a grave statement to make, and is one that will require some verification, and you shall have it, but the statement which I now make is much more serious and presents a condition which is of vital importance, not only to this society but to the people in the community whom its members serve. The statement is that a large number of the members of this society are doing things that they know to be dead wrong, or if they do not know it, it is high time that some one drives the facts home with sufficient force to make them know that they are doing things that are inexcusable in the light of present knowledge. Think not that this statement applies to the younger and less experienced members alone, for such is not the case, as I shall show later tonight upon the screen, for every case that is presented, with five exceptions, is the handiwork of a member who has been president of this organization, and the work of such recent date that it comes within the time when we should know better.

There are quite a number of the members of this society who are filling, crowning and bridging over roots that have not been properly or well filled, and who have made practically no effort to ascertain the actual condition of these roots; and there are still other members who are using mummifying pastes and other pastes as permanent root fillings.

There is no language too strong to use in condemning such practice, and in the light of what stands proven, by both our own research workers and the research workers of the medical profession, I wish to say with all the force at my command that the men who still persist in their use of these pastes as permanent root fillings are not only a disgrace to the profession but are an absolute menace to humanity.

Believing beyond any question that the best interest of humanity demands the saving of most pulpless teeth, and having proven to my satisfaction that nature not only takes kindly to the filling and saving of pulpless teeth, but actually invites it, I have had the courage to present a technic which might be made a standard method of procedure.

ROOT-CANAL TECHNIC; OR, THE TECHNIC OF ROOT-CANAL THERAPY

I propose to discuss this phase of the subject from four standpoints: diagnosis, treatment, filling and prognosis.

Diagnosis: Correct diagnosis is one of the most important factors in successful root-canal therapeutics. Under this heading alone enough material might be accumulated to make a very interesting paper. It will not, however, be my purpose to enter at length into this branch of the subject, simply touching a few of the high spots.

When called upon to take care of any given case, the first thing the dentist should do is to get the history. Here is where many men fail; they thrust a mirror into the mouth and commence digging for their own information. *Don't do it.* Get the history first and as much of it as can he helpful. Know as far as possible, through the history obtained, just what you are expected to treat before you attempt the physical examination.

If the patient comes, as many are doing nowadays, to find if the teeth are in any way responsible for their physical ills or ails, then it is that a most complete history should be obtained. In many cases it is wise even to trace the history of the patient back through and beyond the parents.

Following the obtaining of a complete history, make a very careful physical examination, making every effort to locate any possible cause and trouble before resorting to the employment of the radiogram. Resort to the radiogram only after all other diagnostic means have been exhausted.

In the use of the radiogram always remember that it is but a shadow picture, that it tells the truth as it finds it; the great trouble is that no one has been found who always can interpret correctly the story it tells. There is no place where I feel that as many mistakes are made as in reading radiograms. Few men who have had broad radiographic experience can be induced to attempt a diagnosis from a radiogram alone. The broader the experience the less confidence one has in being able to tell what a picture shows, unless he has both the history and the clinical picture before him.

It is very important that all information possible to obtain be received before anyone can make a diagnosis with any degree of certainty. If an area of rarefaction is found, learn when the tooth was filled, what it was filled with and by whom, if possible. Always remember that there are some root fillings which throw but little shadow, while there are some root-canal dressings employed which may mislead to the belief that a root has been filled when it contains only a dressing for treatment. For instance, rosin in small canals shows but a slight, if any, shadow when compared with red gutta percha, while a well-placed paper point, saturated with oxpara, will throw a shadow almost equal to pink gutta percha, and may lead to the belief that roots containing this dressing have been successfully filled.

Remember, in reading an X-ray, that a dark area or a radio-lucent area, as Ottolengui calls it, may exist about the apex of a root whose pulp is absolutely normal, and that the most virulent infection may produce no radiographic evidence whatsoever, as I shall show later upon the screen.

A dark area may mean any one of a number of conditions, aside from a root abscess or a blind abscess; it may mean nothing more than less density of bone, or an innocent granuloma, or an epithelial root tumor, or a suppurative granuloma, a rarefying apical ostitis, a root cyst, a proliferative pericementitis, a root-end necrosis, or numerous other pathological manifestations indicative of root trouble.

It is not essential that we be able to differentiate between the various lesions mentioned above in our diagnosis. There are mighty few men in the profession today who are qualified to make this kind of a diagnosis. It is important, however, that we be well enough posted to make a fair try at differentiating between a granuloma and root-end necrosis. We also should be well enough posted to judge by the appearance of a radiogram whether there is a fair chance to successfully fill the root canals of a given tooth or whether it should immediately be extracted. Remove the cause of trouble and nature will take care of all pathological conditions beyond the immediate apex of the root.

I also wish to say that there are but few men in the profession who are either properly equipped or qualified to take and successfully develop good radiograms. An elaborate and very expensive equipment is necessary, and a thorough knowledge of photography is essential, in addition to a complete understanding of the anatomical relations, if the best results are to be obtained.

Most radiograms taken are of but little value, and much of the equipment that is being sold to the dentists is worse than worthless. It is my firm conviction that successful radiography, that is, radiographic pictures that are at all reliable and worth while, can be obtained only by specialists in this field. Do not misunderstand the estimate I place upon radiography, for I want to say I feel that dependable diagnosis seldom can be made without resorting to its use in confirmation of other findings.

There are three points I want to leave with you here. The first is that dental radiography has become an hysterical fad. The second is, that it requires considerable more than a radiographic outfit and a piece of X-ray film to make a differential diagnosis. The third is, that the radiograph is but a record of macroscopical conditions, while infection is the result of microscopical invasion.

TREATMENT

In taking up the technic of the treatment of root canals, let me introduce the subject by the statement that it is my firm belief that any root canal through which the human heart can pump the blood is capable of being as accurately and as successfully filled as most members of the profession are filling the straight, easy-of-access, root canals today.

Mark you, I said that it is my firm belief that this can be done. I did not say that I am doing it, or that I can do it at this time, with the equipment that is now at command, nor is it possible to procure the necessary instruments to accomplish these results during the present strenuous times. I will say, however, that I have progressed with my investigations to a point where I have every reason to believe that it will be possible for me successfully to fill the so-called "impossible" root canals, just as soon as it is possible to obtain the services of an expert instrument maker to complete a set of instruments designed for this purpose.

I want no one to think for a moment that the announcement in one of the sub-headings of this paper, that "Frills and Furbelows will be Eliminated," means that I do not appreciate the value of some of them, and employ them when the case so demands or circumstances permit of their employment.

There are numerous things that may be done in connection with present root-canal therapeutics that only can be afforded by the extremely well-to-do, but which ninety per cent. of the people seeking dental service cannot afford. It is, therefore, essential that any root-canal therapeutics which is to become a standard must have for its basis a technic that is elastic enough to permit of expansion or contraction to a point that is within the financial possibilities of each patient. In other words, the financial circumstances of one patient may demand extraction, while in another case the patient may be able and willing to pay for numerous treatments, if the tooth can be made a healthy and serviceable member. The technic employed in the treatment which I advocate and shall describe is capable of such elasticity.

ENTERING THE PULP CHAMBER AND ROOT CANALS

In entering the pulp chamber and the root canals the line of procedure is based upon the diagnosis. If it is a simple case of odontalgia with pulp exposure, I very carefully remove the soft decay and secure as much of an exposure as possible without inflicting pain, and then wash the cavity freely with as warm or hot sterilized water as can be employed without causing suffering. I then apply a dressing of equal parts of oil of cloves and phenol on a small pledget of cotton which is dipped into a few crystals of cocain just before placing it in the cavity, in contact with the pulp. This I usually seal in with a thin "covering of cement." If the odontalgia has been unusually severe and the time of some length, I sometimes resort to a pledget of cotton dipped in sandarac varnish as a preliminary sealing agent, because of the ease with which a patient may remove it in case of gas pressure. The coagulating properties of the phenol are ignored because the subsequent treatment renders this immaterial. The dressing may remain anywhere from twenty-four hours, if sandarac varnish is used, to two weeks or longer, if cement is employed.

At second sitting I usually employ conductive or infiltration novocain anesthesia, or both, and then apply the rubber dam, remove temporary filling and dressing; sterilize all the blocked-off area, using iodin and washing it off with alcohol, or using a strong permanganate of potash solution, removing the stain with oxalic acid and quickly neutralizing it with a sterilized solution of sodium bicarbonate. The latter is a little more difficult to employ but leaves a cleaner and clearer field than where iodin is used.

I then employ a very fine piano-wire broach, passing it down alongside the pulp, to ascertain if the anesthesia is complete, and it usually is. If not, I employ a few crystals of cocain, dissolved in a few drops of adrenalin, to which a drop of four-per-cent. formaldehyd has been added, and proceed to apply pressure anesthesia to the point where the pulp may be removed without causing pain. If the canals are small or so tortuous that the entire pulp cannot be removed, I employ the same technic used in treating putrescent canals and those requiring enlargement by chemico-mechanical means, to be described later.

The next class of cases to be treated is those teeth or roots with putrescent pulps, open or unopen, blind abscesses, active or passive, and those with abscesses with open fistula, all of which are treated in practically the same manner except the tooth which is in the active stage of abscessing. If the case falls into my hands after severe pericementitis has set in and the tooth is extremely "sensitive" to touch, I use novocain anesthesia and proceed to open up the canal or canals and drain through the pulp chamber, leaving it open for a day or two, simply placing a few fibers of cotton in the chamber to prevent food being forced into the canal or canals. At the next sitting the line of procedure becomes the same as that employed in the ordinary case.

Those teeth in which unsuccessful attempts have been made to fill the roots may be brought into this class by removing the faulty root filling; therefore I shall describe the method employed in removing the contents of "filled" canals and then proceed with the general treatment.

In removing faulty root fillings or artificial obstruction, I employ chloroform under pressure at first for gutta percha, using either a pledget of beeswax or unvulcanized rubber to get pressure for a few moments, and then, with the canal flooded with chloroform, I take a fine smooth broach and endeavor to work down through, or at the side of the gutta percha, following the smooth broach with either a Donaldson barbed root-canal cleanser or a Kerr root file of suitable size, to remove the gutta percha, repeating the process till the obstruction is passed. The canal then is washed with chloroform till the cotton is not stained by the gutta percha. In this washing, as well as the opening, every precaution is used not to force any of the contents of the canal through the apical end of the root.

Most root-canal pastes are soluble in acid, and when these are found I use sulphuric acid instead of the chloroform. When cement or gold has been used, the utmost caution must be employed in picking and cutting these out. As a cutting agent in these cases, I use the No. ½ round bur, which must be employed with the most painstaking effort if trouble is to be avoided.

Broken instruments often may be removed by cutting to the side of them and then reversing your engine and running your bur the wrong way, holding it against the broken instrument. Sometimes the use of sulphuric acid to work down beside the instrument and using a twist broach, using the untwisting motion, is employed.

Where the broken broach is "high" up in the canal and firmly fixed, root amputation or loss of the tooth are the only resources left.

Having removed the vital pulp, drained the active abscess or removed the artificial contents of the pulp chamber and canals, my procedure is practically the same.

I neglected to say that one of the first things I do is to thoroughly open up the pulp chamber, using the utmost caution to avoid destroying the normal walls of the chamber until after I have successfully located the opening into each root canal, after which I proceed to cut away enough of the tooth substance to give access to the canal in the straight line with its long axis.

Having cleared the field of action I am ready to enter and open the canals. This is done by the employment of both chemical and mechanical means. I always use the sodium-potassium alloy as my first chemical or therapeutic agent. This alloy is an alkali with powerful oxidizing and saponifying properties. It has such a great affinity for moisture that if the humidity is very high, combustion takes place before it can be carried from the glass tube to the canals. If it is brought into contact with water or moist tissue it burns with great violence and gives off intense heat. It is the quickest-acting and most reliable root-canal sterilizing agent of which I have any knowledge.

The alloy comes in very small tubes, and must be handled with the utmost care to avoid deterioration in the tube from faulty sealing after using. The alloy is carried direct from the tube to the mouth of each canal by the use of a small twist broach, and carefully worked into the canal. Care must be employed to have the pulp chamber dry before attempting to use the alloy. The chemical action which takes place in the canals soon produces quite a little moisture. Do not attempt to dry the canal until after you have made a number of applications of the alloy and then you safely may remove the excess moisture which the chemical activity has produced.

After carrying the agent into the canal for some distance and waiting for a few moments, you may begin your exploration of the canal, using what I am pleased to call a Pathfinder, which is a very fine, smooth broach. This is used with a careful pushing and picking motion. If the broach is stopped, remove and curve the end a little and then insert and by a careful twisting motion you will, in most instances, be able to pass the obstruction and reach the apical foramen. Following this opening to the apex, wipe out any excess moisture with a few fibers of cotton on a broach and again apply the sodium-potassium alloy. Make sure that you carry it well down towards the apex, but not through into the apical space; then let the case rest a few moments while the agent either oxidizes or saponifies all organic matter within its reach, both in the canal and the tubuli. It is my belief that this agent is far more effective in both the root canal and the dental tubuli than any other agent that we can employ. After a wait of a few moments I wash out all the saponified matter. For this purpose sterilized water may be used.

Normal saline solution and Dakin solution have been recommended, but the objection to them in root-canal therapy is the film of salts that they deposit on the walls of the canals. In my practice I use pyrozone as my cleansing and washing agent instead of sterilized water, because of its greater cleansing properties. I continue the washing processes until signs of stain disappear from the cotton fibers or the paper points which are used as a vehicle to carry and remove the cleansing agent. I then dry the canal, using paper canal points to remove the moisture. The canal then is flooded with sulphuric acid C.P. (chemically pure), using an old pair of pliers to carry it to the canal and then using a fine, smooth broach to pump it well down to the apical end. The acid is permitted to remain for a few moments, that it may enter the dental tubules as far as possible. In fact, I carry new acid into canal several times within the next few moments; then it is neutralized by a sterilized solution of sodium bicarbonate, using enough of the solution, pumping it well into the canal and given plenty of time. I use the full strength acid because of its high affinity for moisture and because of the greater violence of its chemical activity when neutralizing it, for I am using acid in this instance not for the purpose of enlarging the canal, but for two other purposes. First, to neutralize any of the sodium and potassium that remains unsatisfied; second, for the mechanical action of the gas formed during the chemical process, in emptying the dental tubules of any saponified organic matter that has not been removed by previous treatment.

Remember that I am not using the strong acid for its dissolving or softening action on the inorganic tooth substance, but chiefly for the purpose of assisting in emptying the dental tubules of any remaining organic matter that they may better be prepared for the reception of my filling materials. Following the use of the sodium bicarbonate I carefully remove all traces of it, using pyrozone for this purpose. The canal is then dried, using alcohol and paper canal-drying points.

At this point two courses of procedure are open for adoption: immediate root filling or the sealing in of a canal dressing for a few days. The decision as to which course to follow is based upon two important factors, the past history, and upon whether the patient is better prepared to stand some physical discomfort rather than an extra financial stress. In other words, if economy is a greater factor than some physical discomfort for a few days, immediate root-canal filling is permissible, provided other things are favorable.

Where economy is not a serious factor, I feel the best line of procedure is to place in the canal a bland antiseptic oil dressing, sealing it in with cement, and letting it remain for a few days till the periapical and pericemental tissues have an opportunity to readjust themselves. Therefore, almost invariably I seal in a dressing of oil of cajuput, because it is a bland antiseptic oil, is very volatile, has a greater affinity or attraction for the dentin than has the moisture, therefore displacing it, and it is a solvent of gutta percha.

At the next appointment I repeat my sodium-potassium, sulphuric-acid, bicarbonate-of-sodium and pyrozone treatment, only that I use very much less of the alloy and acid and very materially shorten the period of their activity over the first treatment.

Thus far we have discussed the simple, easy-of-access canal treatment. We now come to the technic of entering and opening up those canals which are so minute or so crooked that the finest broach cannot be passed to the apex, or those that have become obstructed by either organic or inorganic matter. The successful handling of this class of cases calls for more skill, judgment and dexterous perseverance than any other branch of dental practice, and uses up more of the operator's vital forces than any other class of dental work. It is a service that demands the most from the dentist, and for which the dentist should demand the most from the patient in the way of compensation.

I feel that the treatment of this class of cases should not be attempted till the patient is made to realize the importance of this kind of work, and be made to understand that it is a service for which the highest fee is demanded. Having made those facts clear to my patient and received instructions to proceed, I do so as follows:

The procedure up to this point has been as described above. Another study of the radiogram is made and an effort is then made to conform my "pathfinder" to the curve of the root; then, with a very careful picking, pushing, quarter-turn, twisting motion, I try to pass the broach to the apical end of the root. If a point is reached where the progress of the broach is arrested, it is removed and the tip given a sharper curve and another try made; if unsuccessful, chemical aid is indicated.

The resistance or obstruction may be due either to organic or inorganic substance, or both. The original contents of the canal being organic matter, sodium-potassium alloy is employed, carefully working it down into the canal and keeping it active by repeated applications during the next fifteen or twenty minutes. Then neutralize with C. P. sulphuric acid, repeating application till all gas bubbles cease. Neutralize the acid with sodium bicarbonate. Then another effort is made to pass the pathfinding broach; if it still refuses to pass, the Callahan thirty-per-cent. sulphuric acid method is employed and persisted in until the apex is reached or the possibility of doing so eliminated. If failure is met, amputation or extraction are the only resources.

Sodium-potassium or sulphuric acid usually will assist the broach to pass any natural obstruction. In following these chemicals I use, in addition to the "pathfinder," the finest Knoche spiral reamers, long handle, XXX fine, Kerr finest root-canal files and Donaldson extra-fine root cleansers. Many applications of the sulphuric acid and subsequent neutralization may be necessary, and the most painstaking and persistent mechanical dexterity employed before the apex of the root is reached. In opening root canals I rarely if ever use an engine reamer or a Gates-Glidden drill in opening through to the apex. If I do use them, it is only as a last resort and with the full understanding of both the patient and myself that more harm may be done than good.

I use my fingers as the motor power and rely on a keen sense of touch to indicate the line of procedure. I cannot tolerate the use of the rubber glove in any stage of my root-canal technic, because I feel that I loose much of that which I feel is essential to success and that is, a keen and delicate sense of touch at the tips of the fingers.

In opening up very obstinate cases I frequently resort to the diagnostic wire and the radiogram.

Having reached the apex with the finest broach, it is followed by the repeated application of acid, neutralized, and the employment of Kerr's root files in successive sizes till canal is enlarged to a point where I feel that I can successfully fill it to the apex and a little beyond. I employ great precaution to avoid interference with the tissue beyond the apical end.

In teeth having two or more root canals and one that is obstinate, I fill the canals as fast as they become ready and eliminate them from further consideration in dealing with the troublesome canal.

I sometimes have found that by using pressure I could carry chemicals or medicaments where I could not pass a broach successfully. I have employed beeswax, unvulcanized rubber and slightly-warmed Gilbert's temporary stopping to force sodium potassium, sulphuric acid, sodium bicarbonate, alcohol, acetone and chloro percha beyond points where a broach could be passed. This method is employed only where a considerable portion of the root lies beyond the point of access. Great care must be employed in this procedure or considerable harm may be done.

Having the canal or canals opened and enlarged to a suitable size and sterilized, we are ready for root filling. Up to this time I have said nothing about the employment of strict aseptic precautions because as long as we were dealing with sodium potassium as a sterilizing agent, I was little concerned with anything but the ordinary care; but from the last time it is used on down through the neutralizing, washing and drying steps, the utmost precaution must be employed to avoid carrying anything into the canal or canals that is not absolutely sterile. I cannot stop to describe this technic.

After drying the canal or canals with alcohol, acetone and paper points, a dry point is placed in each canal and allowed to remain a few moments. Upon removal, if there is any indication of moisture at the tip, another dry point is introduced and if, after a few moments, it shows moisture at the tip, or there is excessive sensitiveness of the tissue at the apical end, a saturated solution of trichlorcetic acid is pumped into the canal and through the apex. The acid is self-limiting, forming an eschar, destroying a small amount of tissue on the inside of the granuloma at the apex. It also has the same stimulating effect as when applied to ulcers or any granulated gum tissue of low vitality. The eschar stops all seepage and is later destroyed and removed by the action of the leucocytes. The trichlorcetic acid is washed from the canal and it again is dried as described above.

ROOT-CANAL FILLING

Having a dry canal, I proceed with my filling technic, which is a combination of other well-recognized methods, with modifications of my own. The dry canal is thoroughly coated with Callahan's rosin solution, using care not to have an excess. This is immediately followed by a thin solution of chloro percha. I say "immediately followed" because if the chloroform is permitted to evaporate from the rosin before the filling is complete, we have an obstructed canal which must be reopened before further procedure is possible. The next step is the selection of a suitable gutta-percha point, not one that will fill the canal, but one fine enough that it readily can be passed to the apical end without binding on the canal walls. This is passed *slowly* into the canal till it reaches the apex and gets a response from the patient. If the patient does not respond, wait a moment and then take a fine root-canal plugger and pack the gutta-percha point down till the patient indicates that you are producing pressure on the soft tissue at the apical end. Then take a fine broach and work more chloropercha into the canal and down to the end.

Remove the broach and follow the path made by it with another small canal point, packing it down till response from the patient is obtained. The object is to incapsulate the root-end, and the introduction of new chloro-percha and gutta-percha points is continued a number of times. I think it a rare case in which I do not use at least six canal points as described above.

I prepare my chloro percha beforehand, and use it instead of chloroform, because I want only the softening effect of the chloroform on the point and not its solvent effect. The use of the pure chloroform makes the points very slippery and hard to manipulate, while the chloro percha simply softens the points to a state where they can be packed tightly into the canal and all excess chloro percha forced out, leaving the root filled with tightly-packed base-plate gutta percha.

I feel that incapsulation of the end of root is essential if the best results are to be obtained. Therefore, I make a conscientious attempt to incapsulate all apical ends.

This is difficult to accomplish with freshly-devitalized teeth, while where there is an abscess with a fistula there is danger of forcing an excess of the gutta percha into the soft tissue. In the latter case I avoid this by extending the period of treatment to a point where the abscess becomes a simple granuloma, with the fistula closed where the case may be handled without danger of an excess of the filling material passing beyond the end of the root.

The incapsulation accomplishes two things: It removes all doubt as to whether the apical end is filled and it acts as a valve being forced to place by the pressure exerted by the soft tissues, and later is held firmly in place by the contraction of the gutta percha within.

SOME PROBABILITIES AND POSSIBILITIES RELATIVE TO ROOT-CANAL THERAPY

Thus far I have made direct and positive statements relative to lines of procedure employed in actual practice, but at this point I wish to state a few theories and beliefs which I feel will lead to actualities in root-canal therapy in the near future.

In the opening statement under the sub-heading of "Treatment," I said "In taking up the technic of the treatment of root canals, let me introduce the subject by the statement that it is my firm belief that any root canal through which the human heart can pump blood is capable of being as accurately and as successfully filled as most members of the profession are filling the straight, easy-of-access root canals today." I wish to reiterate that statement, and present some reasons for entertaining such a belief. When my presenting a paper before this body was first contemplated something over a year ago, it was with the idea of developing the technic and presenting a set of instruments which would make the execution of that technic a possibility.

The declaration of war, and the absolute impossibility of obtaining the attention of instrument makers because of the rush to fill war orders, the original plan had to be abandoned. However, I want to give to this society and the members here a little glimpse of what I think the future will bring and to say that its coming will be mainly through the efforts and activities of the members of this society.

First: Complete sterilization and the removal of the contents of all root canals, no matter how crooked or tortuous, is possible, provided there has been no mechanical interference, and that secondary deposits of dentin or cementum have not progressed to the point of complete obstruction.

Second: It is possible for these same canals to be as successfully and as accurately filled as most members of this society fill canals of simple cases. This will be possible through the employment of both chemical and mechanical means. The chemicals and materials employed may be the same as described under the heads of treatment and filling, but in place of broaches and files, "high pressure," both positive and negative, must be employed. This means the construction of a small but powerful air pump for the purpose of producing various degrees of negative pressure within the individual root canals or the pulp chambers as the case may require. The uses to which such an instrument as I have in mind may be put are multiple. Sufficient for the time being is it to mention the removal of the contents of obstructed canals, immediate evacuation of an active abscess through the root canal, the obtaining of samples of the contents of areas of rarefaction at the end of roots, for diagnostic purposes, and several other important uses.

As a companion instrument and the most important of the two is the construction of a high-pressure syringe that is adapted to the purpose of forcing chloro percha and gutta percha to and through the ends of the so-called "inaccessible" root canals. There are just three thoughts I want to leave with you in connection with this instrument. The first is that if a Myers' high-pressure syringe, with but a slight countersink in the enamel, can force a cocain solution through the enamel and dental tubules, and not only entirely anesthetize the pulp but the tissue around the apex of the root, might it not be possible to so construct a similar instrument that would be powerful enough to force chloro percha and gutta percha through the apical end of any root canal through which the human heart has been able to force the blood? The second is that chloro percha is not a root-canal filling, but is employed in most instances as an aid in conveying gutta percha into and through the root canals.

The third is that gutta percha root-canal points cannot be carried into many very small root canals, but chloro percha, with the chloroform removed, becomes gutta percha, and chloro percha under high pressure loses its chloroform very rapidly, therefore is it not possible to carry chloro percha into these minute canals and hold it there under sufficient pressure not only to force out the chloroform but to pack the canals full of gutta percha, under sufficient pressure to insure complete sealing of the canal? I maintain that it is. Think it over; reason it over and then give us the benefit of your views.

PROGNOSIS

When a patient presents himself to a dentist for the first time he is interested in three things: Actual existing conditions, the probabilities and possibilities of securing complete relief from any pathological handicap which may exist, and the probable expense that will be incurred. Diagnosis, prognosis and compensation. The first we have discussed already; the latter we shall not discuss. There remains, then, the subject of prognosis.

Prognosis is a conclusion or prediction relating to the future course or final termination of any pathological condition, or it is the act or art of making such prediction.

Prognosis is based upon three things, diagnosis, clinical experience and knowledge of the laws governing physiological and pathological activities. Prognosis is one of the weakest factors in the every-day life of the dentist. Most of us are too careless in our prognostications, with the result that the patients often are misled and we frequently are placed in an embarrassing position, due to the fact that many times our predictions have failed to come true, the patient not only not receiving any benefit but many times being far worse off in the loss of useful teeth or in the drain upon his financial resources.

Much bitter criticism is being expressed in Cleveland by both the patient and the physician, and some of it is very drastic and justly so, for quite a number of men who have herebefore been considered safe and sane in their judgment, have completely lost their heads and either are advising the extraction of most pulpless teeth or are predicting complete relief from pathological conditions as a result of the successful treatment and filling of root canals, showing areas of rarefaction around the apices of the teeth.

From a prognostic standpoint youth offers the most favorable, while old age offers the least favorable opportunity for successful and lasting results. Youth, with its high tissue vitality, adapts and readjusts itself to conditions that age, with its lowered vitality, could not tolerate. Youth, with its large and easy-of-access root canal, permits of the one-treatment-immediate-filling propaganda as described by Cameron, of Philadelphia, while old age, with its very small root canal, offers the least favorable conditions either for sterilization or filling of the canals at the end of several treatments.

In dealing with women, pregnancy, lactation and cessation of the menstrual periods must be considered as important factors in prognosis. In dealing with the individual tooth the first consideration is the surrounding tissue, then the conditions within the tooth itself.

The most favorable from the prognostic standpoint is the newly-devitalized tooth. Then comes those teeth with the blind abscesses, all of which, if the roots are incapsulated, may be looked upon in the most favorable light. Then follow the abscesses with fistula. If the fistula is of recent date, the prognosis may be very favorable. If the fistula is of long standing and there is a large and constant flow of pus, then the prognosis is less favorable; while if the condition has continued to a point where there has been resorption of the apex of the root, the prognosis is most unfavorable. If these cases do not respond readily to treatment, extraction or amputation must be resorted to.

In case of amputation the prognosis is very unfavorable unless that portion of the root or tooth which has been divested of its pericemental membrane has been completely covered by an amalgam or carefully-placed gutta-percha filling. Otherwise resorption or absorption surely will occur or recur, producing conditions as dangerous and as troublesome as the original lesion.

Be careful what you promise, for already hundreds of people and many physicians are damning the members of the dental profession, not alone for making promises that failed to come true, but for permanent damage which has come to patients through extractions that have not produced a particle of improvement in health, but to the contrary, have proven a tremendous handicap physically.

Mr. President, I have pointed out the unsettled, in fact, you might say the hysterical state of mind that exists in the dental profession relative to root-canal therapy. I have pronounced the root-canal therapeutic as practiced by the dental profession irrational, insane, if you please. I shall present pictures which show some of the mistakes good men are making today. I have offered a root-canal therapeutic technic which I have every reason to believe is safe and sane; a technic that is elastic enough to meet the need of the most humble patient on the one hand, or meet the requirements of those who serve patients who can afford to make an extended fight to save any tooth.

That the root-canal therapeutics in vogue at the present time are irrational or insane can readily be proven. In the civil and criminal courts of this country it takes a jury of from twelve to sixteen men to decide whether a man is sane or insane. I defy you or any other member of this society to select ten men in this room who have been out of college five years and who are not members of some study group that has adopted a definite root-canal therapy, and have these men write out their line of procedure and find any two out of the ten who are employing exactly the same methods, using the same instruments, medicaments, chemicals and filling materials. If this is true, and I am absolutely positive that it is, what have we to offer the young men coming into this society seeking counsel and helpful advice?

My belief that the root-canal technic which I have presented is safe and sane is based on my own experience, coupled with the fact that it combines into one system the good things that have been and are being employed by men I know who are the most successful in their root-canal work. Most of it has been selected and combined from the works of some of our best and most successful men, and this, coupled with a number of additions of my own, is what I am offering to this society as a standard line of procedure, which, in the light of our present knowledge, secures the sanest and safest results.

I do not offer this as an ideal method. I offer it as the best I have been able to find, after twenty years of very active practice. It is the best I know; I do not know that it is the best. But this I do know, and that is that no dental society anywhere presents a group of men who are better qualified to take that which I have offered and build therefrom a root-canal technic that this society can endorse and dare stand back of as the safest and sanest line of procedure, in the light of our present knowledge and understanding of laws governing dental pathology and physiology.

It has been given to me, as is given to few mortals, an opportunity to know and understand what nature can and will do, if she is given the right kind of support and co-operation. Metaphorically speaking, I have, as many of you know, practically passed through Death, Hell and a Resurrection, during the past eight years. During the first five years of that time I underwent seven surgical operations and three very critical periods of illness. Four of the surgical operations and one of the illnesses were most grave, indeed. My personal experience, while a very interesting story from the standpoint of root-canal therapeutics, and is made a part of the paper, is too long to read at this time. I will be glad to give it and discuss it later with those who are interested.

Sufficient to say that I believe that practically all my suffering was caused by a tooth, a central incisor, treated and filled in early boyhood, a tooth which during forty years never gave the least sign or indication of trouble. A tooth that had been radiographed several times and pronounced healthy and safe by a number of the leading radiographers and root-canal experts of the country. We shall throw a picture of this tooth with others on the screen tonight and let our own experts select the offending member if they can.

The question arises at once: Why was this trouble not located earlier? Replying, will say that during the last four years I sacrificed four pulpless molars hoping that in each case we had removed the source of trouble. Of all the men who saw the radiogram of the central incisor and had its history, including a large number of our own society who examined it on their way to the state meeting in Dayton, there were only two men who suggested anything but that it be left alone.

Gentlemen, in this recital I have placed all my cards upon the table. I may have displayed some insanity in the matter, but I can assure you that it is no greater than that displayed and practiced by many of you, who have done as I have done—believed or disbelieved many of the things which we have heard or seen as presented by men whom we have been led to believe knew and understood the things they were presenting. But I want to say that I have found, and you will find, that when these men are stripped of the high-sounding names of the institution which they represent and the opportunities it affords, they are just plain, ordinary mortals like the rest of us, and just as liable to make mistakes as we are. That they have made mistakes in the past, those who know them intimately will testify. That some of them are making serious mistakes now is being proven, or will be proven in the near future, by some of the greatest scientists the world has produced.

The criticism that I have to offer against some of the workers of our Research Institute is that those who are advocating the necessity of sterilizing the tissue surrounding the apical end of pulpless teeth are making the same mistake that the surgeons of the world were making a few years ago, when they believed that it was necessary to irrigate all wounds with strong antiseptic solutions, and applied dressings, moistened in antiseptic solutions, changed every day, to avoid any possibility of infection.

Today the surgeons of the world are irrigating with normal saline solution and applying dry sterilized dressings and permitting them to remain until the wounds are healed. The surgeons found that they were positively handicapping nature by the use of their antiseptics, which not only prevented the normal growth and development of the reparative tissue, but in many cases actually invited infection by the destruction of tissue, due to the action of the antiseptics used. Those of us who are trying to sterilize the tissue beyond the apical end of the roots are doing as did the surgeons of old, and we will as surely find, as they found, that nature will do her part and do it better and with greater speed when unhindered by our efforts.

There is no known method of destroying pathological micro-organic life in the living human tissue without doing infinitely greater damage to the animal tissue which surrounds the micro-organic life.

I have presented the personal side of this paper because I want to prove that by early professional training, twenty years of active practice and practically eight years of actual physical experience, I am qualified, at least in a small measure, to pass judgment upon some of the things I have presented tonight.

I have criticised some of you tonight, but none of you as severely as I have criticised myself. I have criticised some of our research workers, and I believe that it is for their good, your good and for the good of humanity that such criticism be made. I am a living proof of the correctness of some of their findings, but also I am a living witness of the fallacy of some of the conclusions which these men have drawn, for some of the things which they have presented as facts are, as the Irishman said at the end of a long address: "Gintlemin, the facts which I have jist presinted are false facts."

If some of the conclusions that these men have promulgated are true, then as a result of the personal experience I have had, practically every vital organ in my body should be honeycombed with local areas of infection; but the opposite is the truth, for within the past few months I have passed through the hands of some of the greatest diagnosticians that the country affords, submitting to tests in the diagnostic departments of two of the greatest institutions in this country, only to find that aside from the fixed position of part of the intestinal tract, due to surgical interference, producing retarded intestinal digestion and delayed intestinal evacuation, all the vital organs of my body were in perfect working order and in better condition than most men ten or fifteen years younger. Since the recent treatment and filling of the central incisor, I have made wonderful improvement and I am feeling fifty per cent. better than at any time during the last ten or twelve years. All distressing abdominal tenderness has disappeared. I am able to sleep at nights better than any time since I was hurt, eight years ago; have better digestion than I had at any time in fifteen years, and have brought my intestinal difficulties under such complete control that I will say that I expect to buy flowers for many of you who were expecting to perform that last service for me.

In this paper I have referred a number of times to the men at the head of the Research Institute of the National Dental Association, and have done so in the spirit of criticism, but if there is a man or woman within this audience tonight who feels that this criticism has not been offered in the kindliest of spirit and in the interest of great good for all, I want to disabuse for all times the mind of that individual or those individuals, of this erroneous thought; for I want to say to you that I appreciate the great effort that these men are putting forth and the sacrifice they are making in your interest, my interest and in the interest of humanity; and I want you to know, and all the members of the profession in this country to know, that the men who are doing the greatest amount of work in the scientific research institution, are men who are giving their time without compensation; men who are compelled to earn their livelihood by standing at their chairs, either before or after they have spent much of their energy in an endeavor to help their beloved profession and to relieve suffering humanity.

In conclusion, let me call your attention to one of the things which our research workers seem to have forgotten, and which you seem to have forgotten and that is that the human body is the greatest fighting machine in all creation, and is equipped as none other to fight the foe which attacks either within or without. Thoroughly sterilize your root canals and then fill them to the end or a little beyond and the cases are rare indeed where you need to give thought to the few germs that remain in the immediate tissue.

Have we forgotten that in the blood of a child a few hours or days old, as well as in the blood of every living human being, may be found numerous forms of pathogenic bacteria? Have we forgotten that so long as these pathogenic germs go racing from one point to another, chased by the leucocytes in the blood, no harm is done? Have we forgotten that just the moment that one of these germs stops anywhere along the course of the circulatory systems of the body, it is instantly pounced upon by nature's warriors in the blood, the phagocytes, and either immediately destroyed and carried off through the lymphatics, or by the accumulation of vast numbers of these warriors and their activities, this germ or these germs are walled off from the rest of the body by the imprisoning influence of new tissue erected for that purpose?

If we have forgotten these things, or if we never knew that many if not most of the areas of rarefaction found at the end of roots are, instead of being a menace to the human body, a protection against irritation or infection as a result of faulty root-canal therapeutics; if we have forgotten these things or did not know them, it is well that we turn again to the study of the laws of nature as applied to mankind, and possibly we shall then learn what some of our research workers seem to have forgotten, and that is that nature plays the most important part in the care of all pathological conditions and in compensation for our surgical interference.

Our mission is not to do or attempt to do for nature the things which she is a thousand times better equipped and qualified to do for herself.

Adopt tonight a safe and sane method of treating and filling the root canals of pulpless teeth, and stop the insane efforts to completely sterilize the tissue which lies beyond the apex of the root, either medically chemically, electrically or mechanically, and in nine hundred and ninety-nine cases out of a thousand nature will do the rest, and will do it more thoroughly and better than if we interfere with her.

It is ours to co-operate with nature and not attempt to do for her some of the things which are being advocated but which, beyond any question, have acted as a handicap to her. Assist in the construction of a root-canal technic that this society can adopt, and that we all can adopt and practice with a certainty that we are doing for our patient the safest and the best that can be done in the light of our present knowledge and experience.

As a final word, I want to say to you that in spite of all of the experience I have had and all the suffering that I have endured as the result of faulty root-canal therapy, I want to plead with all the force of my command for the conservation and saving of every possible tooth in the human organism.

Know the conditions which exist on the inside of a non-vital tooth, know what the radiogram shows; then if you can't fill it to the end and a little beyond, warn your patient of the danger and if he is not willing to sacrifice the tooth, watch the tissue at the end of the root by an occasional radiogram and if he should at any time show symptoms of a lowered vitality, or give evidence of any form of infection, extract, and extract at once and take no chances.

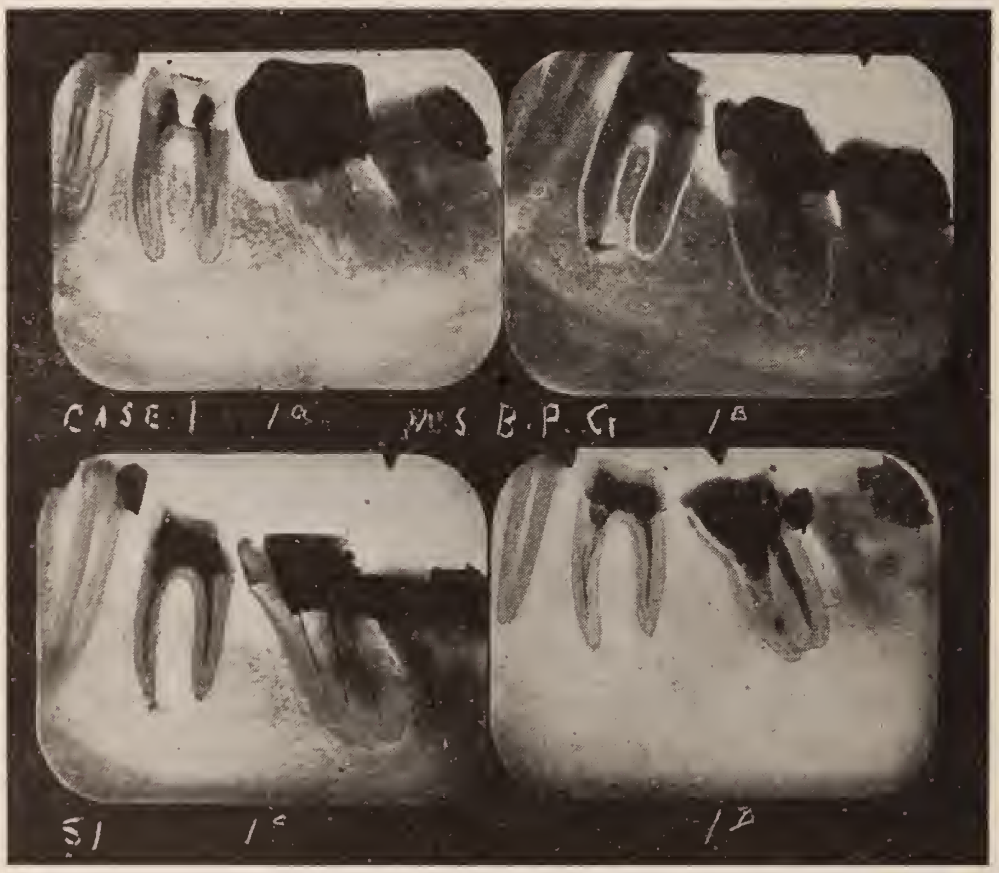
I have repeatedly heard the head of the dental research work in this country say that "nature has been very kind to us, gentlemen." I say to you that nature has not been "kind to us," but on the contrary she has been driven to make frantic efforts to protect herself against the outrages which we have been committing upon her, and now comes some of these men who add insult to injury when they advocate the necessity of sterilizing the tissue which lies just beyond the apex of the roots of non-vital teeth. To advocate such a line of procedure at this time is to advocate the committing of a crime against nature, for up to the present time *science has been unable to produce any method of destroying pathogenic micro-organic life in the tissue of the human body that is not far more destructive and disastrous to the human tissue than it is to the micro-organic life contained therein.*

I want to proclaim to you people here and to the dental research workers throughout the country the fact that when the Great Creator constructed the human organism He placed therein a system or method of protection against the activities of pathogenic micro-organic life which cannot be equalled or excelled by human agencies or activities—a system or method of protection which, if given half a chance to perform her normal function, will so readily *destroy, remove or completely imprison* any pathogenic micro-organic life which may be found in the tissue immediately beyond the roots of a pulpless tooth which has been perfectly filled, that we as members of the dental profession need give it no further concern.

So I say to you, and to the profession in general, that the sooner the dental research workers of this country awaken to the fact that they are trespassing upon nature's function when they attempt completely to sterilize the tissue which lies beyond the end of the roots, cease their frantic efforts in this direction and turn their attention exclusively to thoroughly sterilizing the root canals and the giving to the profession of a better method or an ideal method of filling these canals, the better it will be for humanity, the dental profession and our research workers.

In the meantime and until such a time as they shall be able to produce better and more reliable methods, I offer you that which has been presented tonight as a safe and sane method of procedure, and one that can be relied upon as being acceptable and satisfactory to the human tissue surrounding the roots so filled.

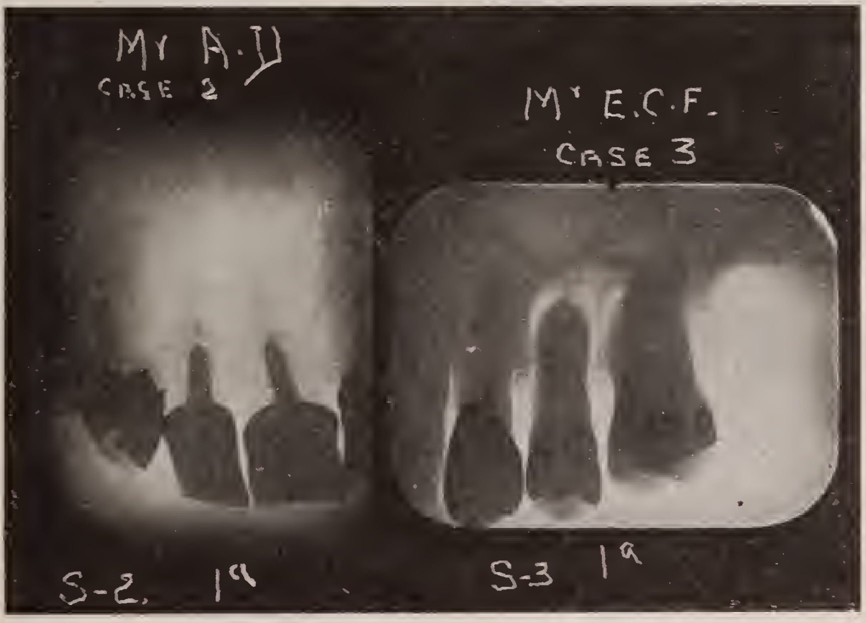
Case 1: Mr. B. P. G. is presented with a view of showing a number of mistakes. This is my own case—patient I worked for seventeen years ago. At that time he found my prices were a little higher than he wanted to pay, so he asked me to refer him to another dentist. I gave him the names of three good dentists, and from that time on I saw nothing of him except meeting him on the street, until four years ago, when he wanted me to take care of the family. About two years ago he came to me to reset a crown that he had been wearing on the lower right first molar. I learned that the patient's health was not very good, and when the crown was off, insisted that we have a radiogram taken to ascertain the condition of the roots. The patient demurred, saying that he never had had any trouble and insisted the crown be replaced. I refused to do so and had quite a time persuading him to have a radiogram taken. *Fig. 1-A* shows the condition I found. Mistake No. 1 is that seventeen years ago I put a fairly large amalgam filling in this tooth without asking the patient anything except whether he ever had any trouble or tenderness in the tooth. *Fig. 1-B* represents the condition at the end of the roots immediately following the filling of the same. You will notice that the canals on the mesial root are filled as described in the paper, while the distal root does not show incapsulation. Removed the filling to incapsulate and found that we had completely filled the root but that the rosin filled the lower end of it and did not show a shadow. In *Fig. 1-B* you also will notice that we have removed the crown from the second molar and *Fig. 1-C* shows the condition as we found it. The mesial buccal canal was perforated about one-half way down and the original filling terminates at this point. This figure shows the diagnostic wires in place. I wish to say, by the way, that this tooth is turned about a quarter in the arch so that it shows an abnormal position as related to the roots. I advised the removal of the mesial root and preservation of the distal root. Patient refused to have this done and went to New York to one of our leading specialists who told him that the root could be filled and the tooth made a safe, serviceable organ. I did not believe it, but upon the patient's insistance I undertook the work, with the result as you see it in *Fig. 1-D*. The little ball of black filling shows about one-eighth of an inch above the apex, represents the point of perforation.



Case 1

The mistakes were: First, the filling of any pulpless tooth without ascertaining the condition of the roots before doing so. The second mistake was the failure to incapsulate the distal root of the first molar on the first attempt. The next two may or may not be mistakes, that is, to advise the patient to have one of the roots removed and preserve the other. The other is the filling of a perforated root with the result I show in this figure. I wish, however, to have you remember the way this perforated root canal has been taken care of for comparison with one I shall show later by another individual. A point of great value in connection with this case is that this patient absolutely refused to have radiograms taken in the first place; then after finding the conditions and starting the treatment he refused to have the root out and went to considerable expense to save the root we had advised extracting. Some of you may be interested in the amount of money this man was willing to pay to save that root, and if you will ask me privately what the cost and how willing the patient was to pay it, I will be glad to let you know, as it demonstrates something of what people will do when they understand what they have to face.

Case 2: Mr. A. H. D. is a case which came to me about ten years ago with a very hard tumor situated just above and a little to the left of the angle of the nose. The tumor was so hard and rigid that we were suspicious that it might be fibrous or even ossoeus in nature. History showed the filling of the roots of the upper left lateral and central incisor a year and a half prior to the formation of this abscess. Our diagnosis was that the tumor was the result of faulty treatment of these teeth and directed the patient to go back to his dentist and have the crowns removed and roots treated. In the meantime a Leucodescent 500-candle-power lamp was used with the result that the tumor softened very materially and by the next day the abscess was opened through the gum over the lateral incisor. When the patient returned to his dentist he advised letting the thing alone and letting nature take care of it. This man is an old practitioner, a man who stands high in local society work, and the patient carried out his instructions. Some years later he presented himself to me for care and treatment, with the result as shown in this figure. Both the roots of the central and lateral, you will find, were partially absorbed or resorbed, and it was necessary to remove these and considerable necrotic bone. I want to say that this is one of the very few cases in which I found it necessary to remove much necrotic bone tissue.

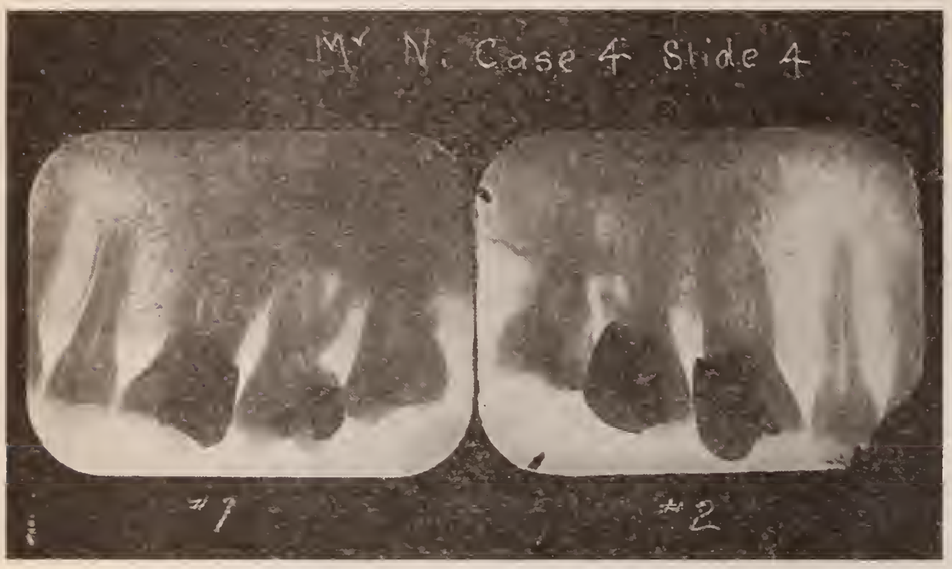


Case 2 Case 3

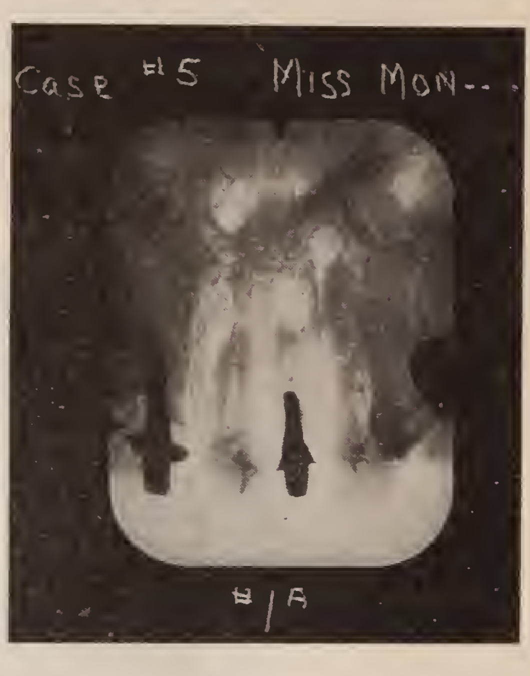
Case 3: Mr. E. C. F. is a case where the diagnosis led one to believe that this root canal contained dead pulp and the history and the radiogram resulted in such a diagnosis. I will say to you that the pulp was vital and the abscess was pericemental.

Case 4 is a case which was referred to me by one of our prominent nose and throat specialists for the purpose of locating an intense pain in the left side of the face. This is a case that was in the hands of a very prominent periodontist in the city and had been a patient of this man for some months. It is presented for the purpose of impressing upon those who are practicing periodontia the fact that they have some responsibility aside from scaling the teeth and treating the gums. This patient was suffering from a severe case of odontalgia which the periodontist failed to locate—the lesion being in the upper left second molar. This is a case which had been under treatment for tuberculosis some years ago and had been getting along in pretty good shape until a few months preceeding his coming to me. In addition to finding the exposed pulp in the upper left second molar, we found the distal buccal root in that tooth completely denuded and standing in a pus pocket. The other two roots were almost entirely denuded and the tooth was promptly removed. On the right side, the distal buccal root of the upper second molar was also completely denuded and standing in a pus pocket. In this instance the lingual root and mesial buccal root was filled. We amputated the distal buccal root in this case. The case is still under treatment and some of the root canals in the other teeth must be refilled or the teeth removed. The patient in this case completely lost the sight of the right eye for a time, but at this writing the sight is slowly returning. The criticism of the periodontist in this case is that with the history of this case, every cavity should have been taken care of promptly and every diseased root that could not be taken care of immediately removed and the patient given a square deal and an effort to regain his health.

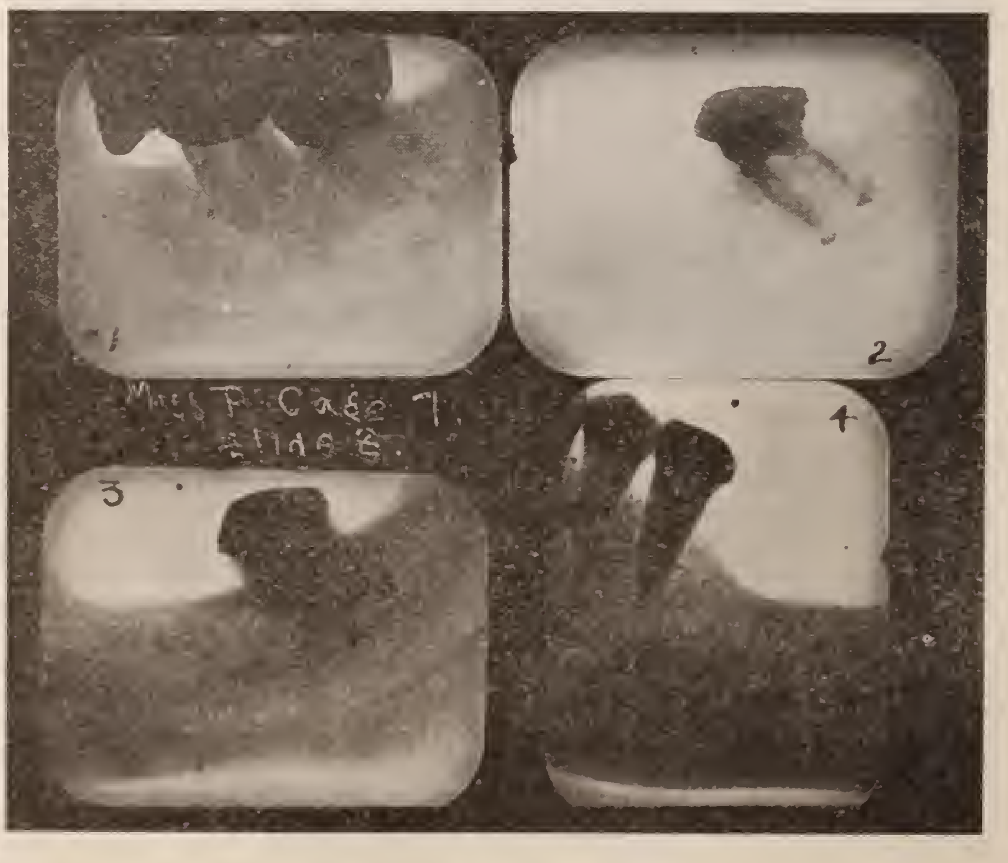
Case 5: Miss M. E. M. is presented simply to show the condition we found in the mouth of a young lady who is one of the most beautiful young women in Cleveland. Has a beautiful complexion and a perfect physique, and until two years ago when these teeth were treated and crowned, seemed to be in good health. She was referred to the speaker by her physician, with the request that we ascertain whether her teeth were in a condition that might account for the state of her health. In addition to what the picture shows, I will say that this case is in the process of receiving treatment at the present time, and that upon opening up the various roots, we found that some form of paste had been used as root-canal filling. This case represents the work of a member of this society.



Case 4

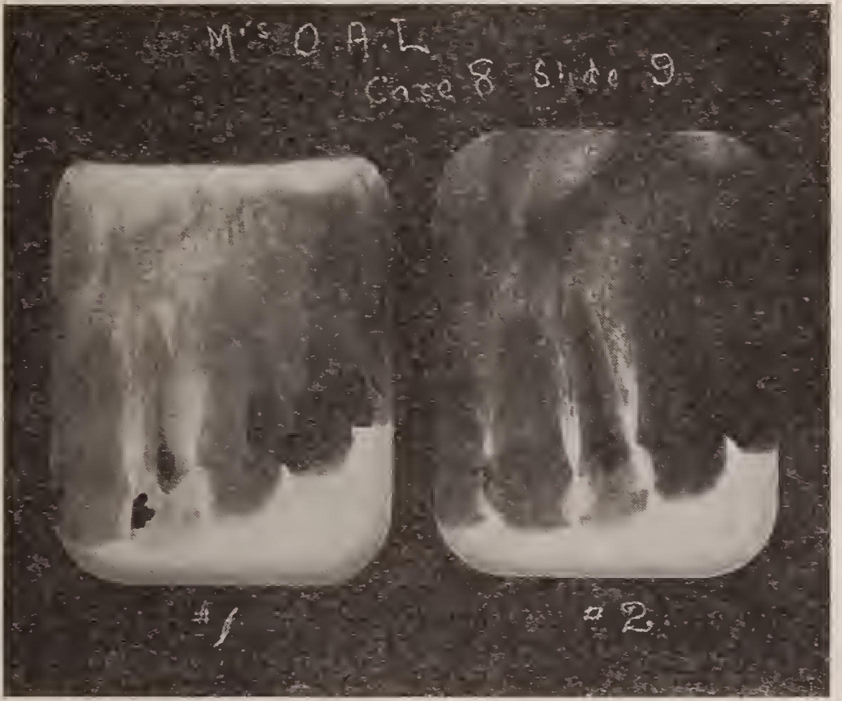


Case 5



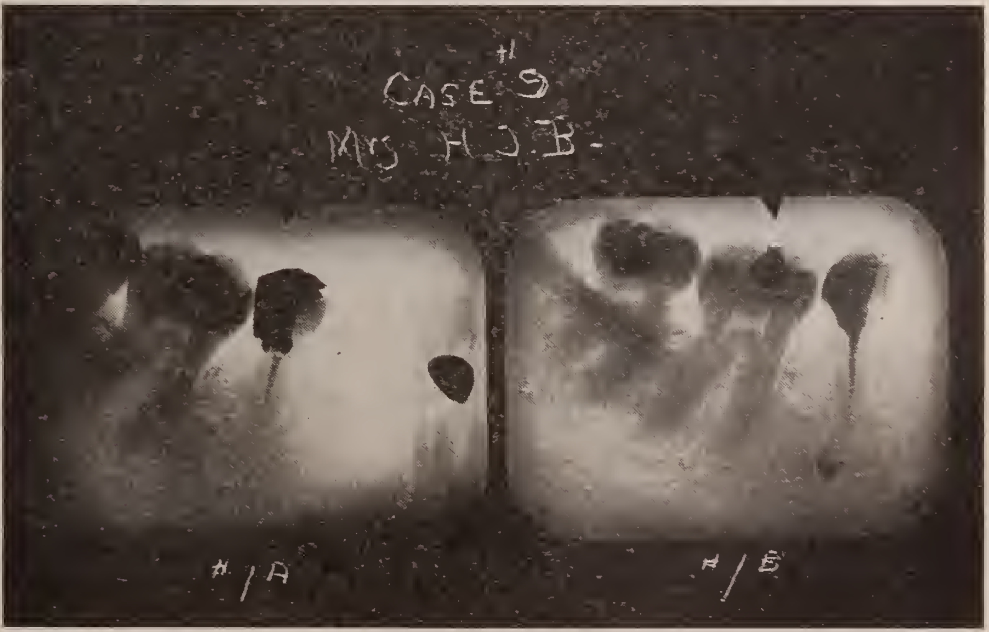
Case 7

Case 7: Miss L. L. P., represents a piece of bridge work that had been placed upon the lower second and third molars. The patient came to me with a very large abscess at the root of the third molar. The abscess was drained through the soft tissue and later the bridge was removed. The second molar was found to be in such a condition that there was no possibility of retaining it in the jaw. The second figure shows the result obtained in filling the roots of the third molar, and was taken immediately after they were filled. *Fig. 3* shows the condition of the root at the end of six months, showing that the tissue has been almost completely restored around the mesial root, while there still remains a larger area to be filled in around the distal root. This tooth will be under observation for some time. *Fig. 4* shows the right lower second bicuspid with the pulp removed and an attempt was made to fill the root to the point of incapsulation. This represents another failure in that we used an excess of rosin and got all the symptoms of incapsulation, which means that the rosin was forced through and not the gutta percha as intended.



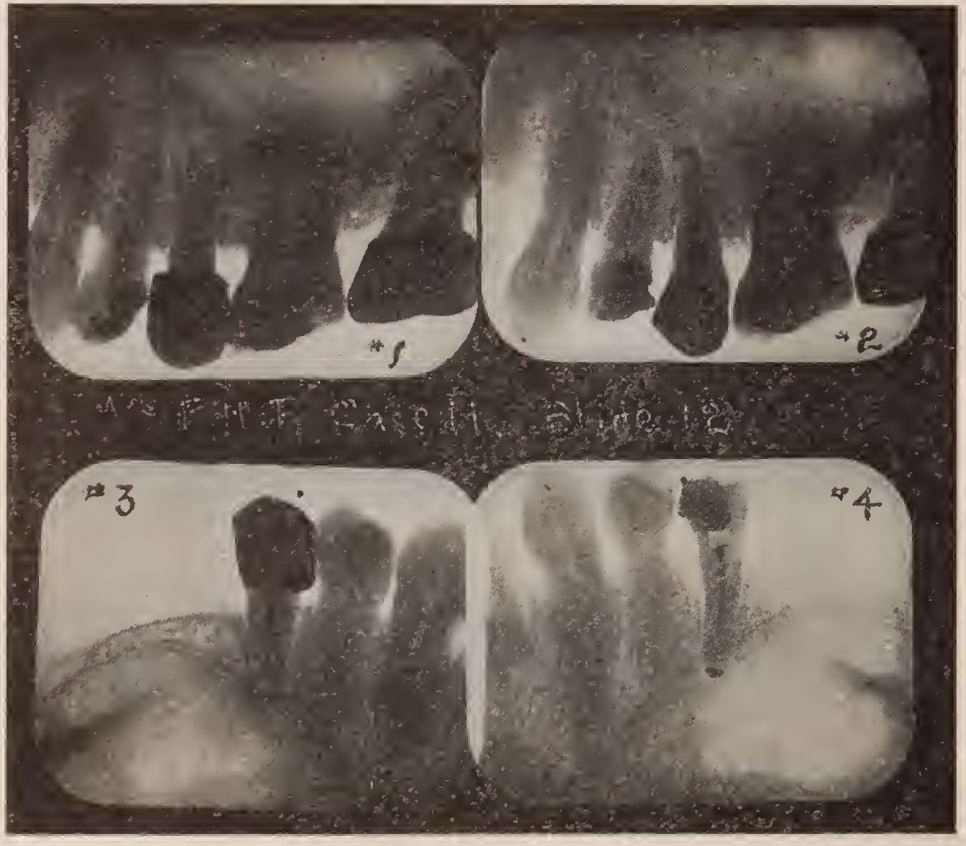
Case 8

Case 8: Mrs. O. A. L., is the workmanship of a very prominent ex-president of this society and was later passed upon by another ex-president, also a very prominent man and a friend of the first operator. Both advised the patient to let the root alone, but it continued to be tender and annoyed her quite a little. She came to me for relief from the difficulty. I treated and filled the root last August, believing that I had incapsulated the root. The trouble, however, completely subsided, giving the patient no trouble; and we waited and a short time ago we had a radiogram of the case taken. The second figure shows the finished tooth and the results obtained. From the standpoint of results obtained, the work is a success, but I believed that I had incapsulated the root. I was very much surprised to find that I was mistaken and present this as one of the mistakes which was successful.



Case 9

Case 9: Mrs. H. J. B., represents the work of a very prominent member of this society. She had been suffering with a great deal of neuralgia through the left side of the face and a great deal of soreness in both the first and second bicuspids. The attempt was made to treat the first bicuspid as the source of the trouble. Failed to succeed, and finally removed the tooth, thinking that was the sole cause of the difficulty. The trouble persisted and she consulted another very prominent member of this society who, after receiving the history and learning who the workman was and examining the radiogram, advised letting the teeth alone, feeling that the trouble would clear up in a short time. You will observe that the second bicuspid is filled just a little over one-half the length. The second figure shows this tooth as treated and trouble eliminated. Will say that, considering the small area of rarefaction at the end of the tooth, we were much astonished to find the large amount of gutta percha that had been forced through the end. I try to avoid such an excess as it is likely to make the tooth tender for a short time after the root is filled.

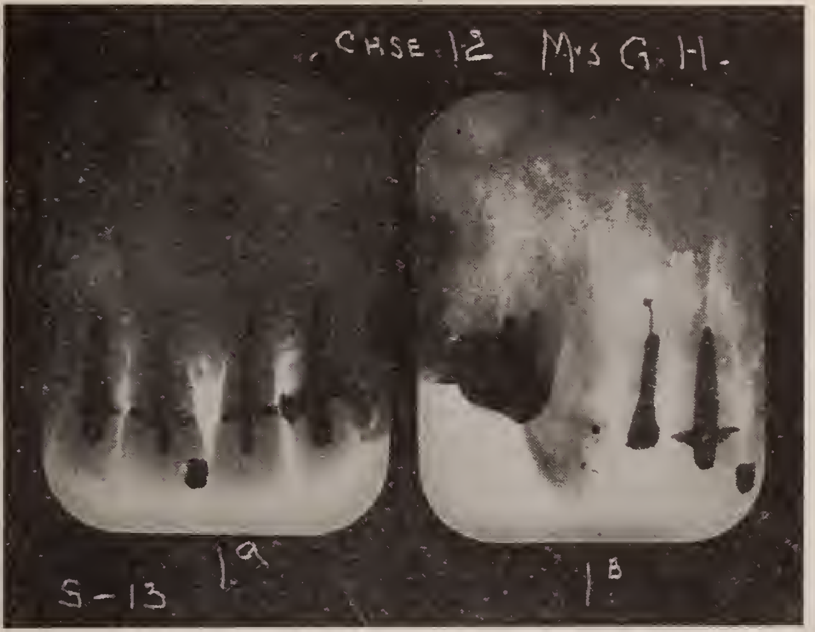


Case 11

Case 11: Mr. F. H. F., the first figure shows the condition found at the time the patient presented. Attempted to treat the first upper right bicuspid and after weeks of unsuccessful effort, *Fig. 2* shows the distance to which we had been able to open the root canals at the end of that time. This tooth was extracted and it was found that the root canals had been completely eliminated by secondary deposits. The second bicuspid as shown in the first figure was crowned and the root almost filled to the end, but you will notice the area of rarefaction. *Fig. 2* shows this canal successfully filled. The third figure shows the lower left second bicuspid, containing a gold crown and the root filled about half way down towards the apex. The fourth figure shows the crown removed and the root treated and filled as described in our paper tonight. Unfortunately the slide maker mounted No. 4 wrong side to.

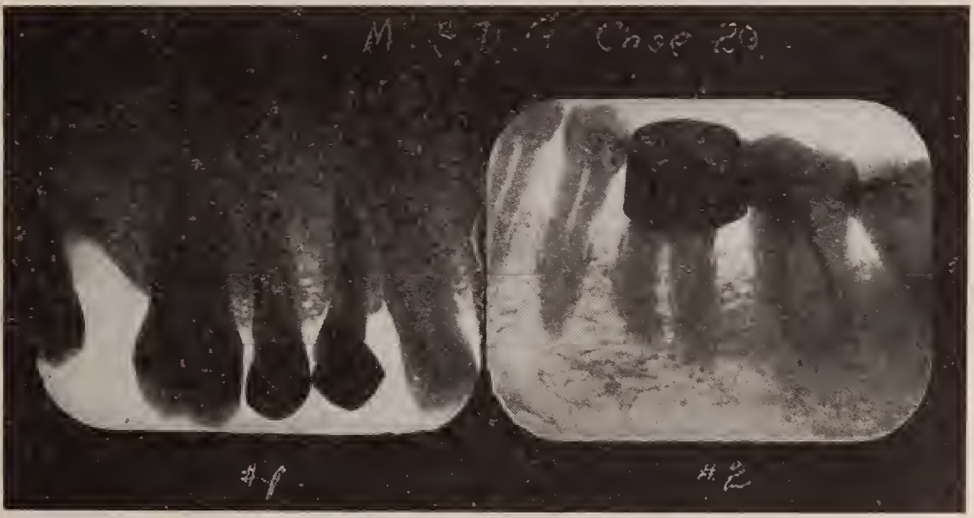
This slide is marked Mrs. F. H. F., but that is a mistake of the slide maker. This is a case of a man of middle age who had suffered considerably with rheumatism and also with frequent attacks of tonsilitis. Since the removal of the upper first bicuspid and the successful treating of the roots, there has been no symptoms of either rheumatism or tonsilitis.

Case 12: Mrs. G. H., represents one who had been in the hands of two of our very prominent members. This patient had been losing in weight for many months and became very ænemic, and it was thought she had tuberculosis. Upon removal of the crown of the left upper lateral incisor, which shows the large abscess to beyond the pin in the root, we found that the canal had been filled with some one of the various pastes. The second figure shows this root filled as we believe ideally. The other crowns shown in this figure were placed by the same man and it is deemed advisable under the circumstances to remove these crowns and fill the roots in the same manner that we filled the lateral incisors.



Case 12

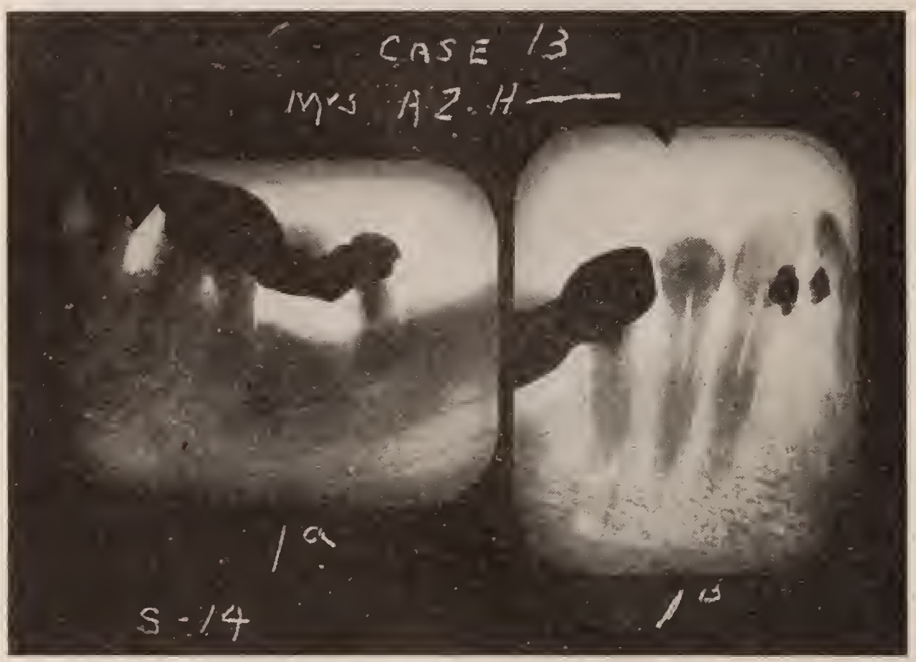
Case 20: Mr. S. D. G., shows the roots of a first and second bicuspid which were treated five years ago. These two roots contained gold crowns, were very loose, the soft tissue over the roots was a dark purple and there was a large fistula on the buccal aspect of the gum. Pus was discharged very profusely. Patient had been advised to have the teeth extracted, but refused to have them removed and came to me for treatment. Upon examining the teeth I advised extraction and that he should go back to his original dentist. He demurred and asked me if I would undertake to treat them, providing he was willing to have me attempt it and pay me well for the time expended. I told him that I thought it was a hopeless case but was willing to make the effort. After five years I am presenting this picture as one of my mistakes which had proven to be successful. My mistake was to advise extraction and I proceeded to treat these roots, feeling that it was a useless effort. That I was mistaken is proven by the first picture on this slide, for it certainly shows a complete building in of the osseous tissue around the apices of these roots. These roots were filled with chloro percha and gutta percha, preceded, as I recall it, by Callahan's rosin solution. This, however, was prior to the time that I began an effort to incapsulate all roots.



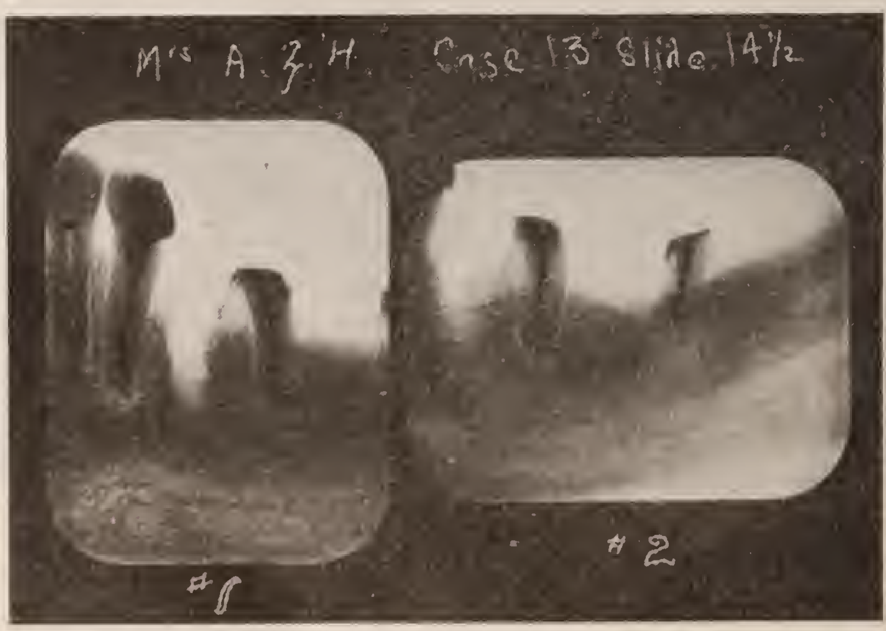
Case 20

Picture 2 on this slide is presented for the purpose of showing the results obtained for this patient within the past two years, when it became necessary to destroy the pulp under a large gold filling which had been placed in the lower second molar quite a number of years before. Novocain anesthesia was used for the purpose of removing the pulp and the roots were filled at the second sitting. As to whether we were successful in our undertaking the pictures speak for themselves. With regard to the gold crown which appears on the first molar, I have nothing to say except that it was not my work and that we finally were able to have the patient have it removed.

Case 13: Mrs. A. Z. H.; the next three slides all are from the same case and are of a woman about 45 years of age who has been a semi-invalid for the past ten years, been in the hands of a number of physicians, surgeons and dentists during that time. Was finally sent to me by the last physician whom she consulted. *Picture 1-A* shows a bridge which has been mounted on the distal root of the lower right third molar and upon the roots of the first molar. The root canals of these teeth were treated and filled by a prominent member of this society some years ago. The bridge, however, was constructed and inserted by a member of this society who, next to myself, probably has talked as much mouth hygiene as any other man in the United States. The patient had been ailing for some considerable time before this bridge was inserted; in fact, stated to to the dentist she was having her teeth fixed up hoping that her health would be better as a result. *Picture 1-B* shows one end of a bridge inserted on the left lower second molar and on the first bicuspid. This figure shows the first bicuspid; the root canals of which had been treated and filled by the same man who treated and filled those shown in *Picture 1-A*, and the bridge was placed by the same man who made the one on the other side. The figures speak for themselves, showing the failure of the first man to fill the roots successfully, and the error made by the second man in not ascertaining the condition of these root before attempting to construct and insert a bridge on the same.



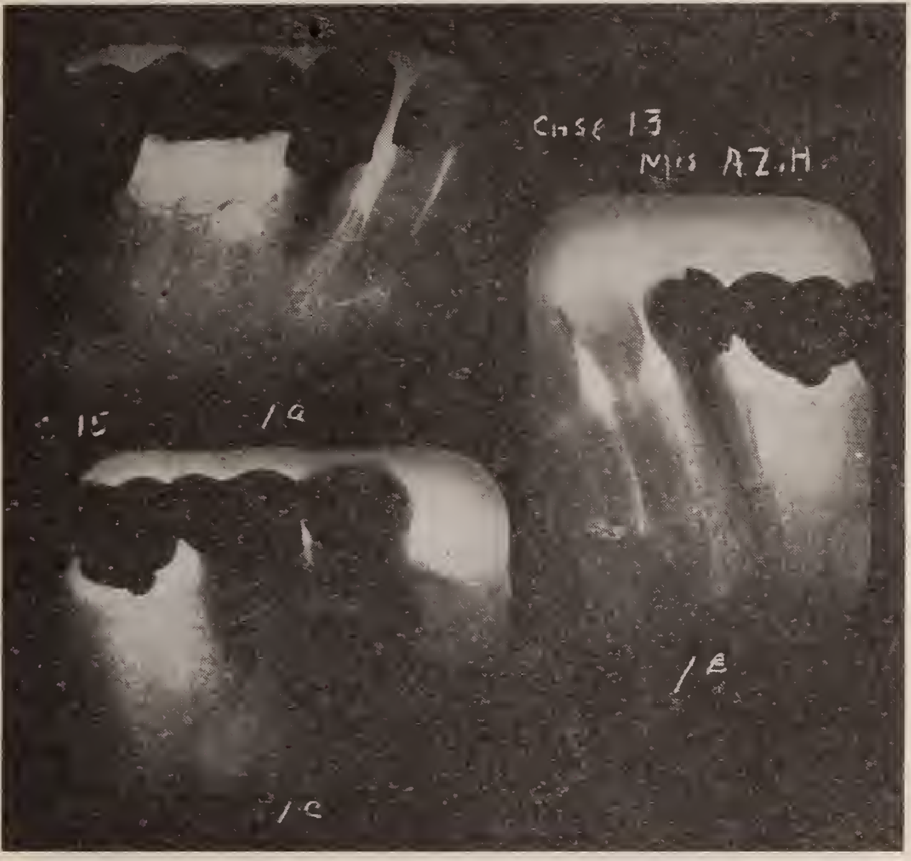
Case 13



Case 13

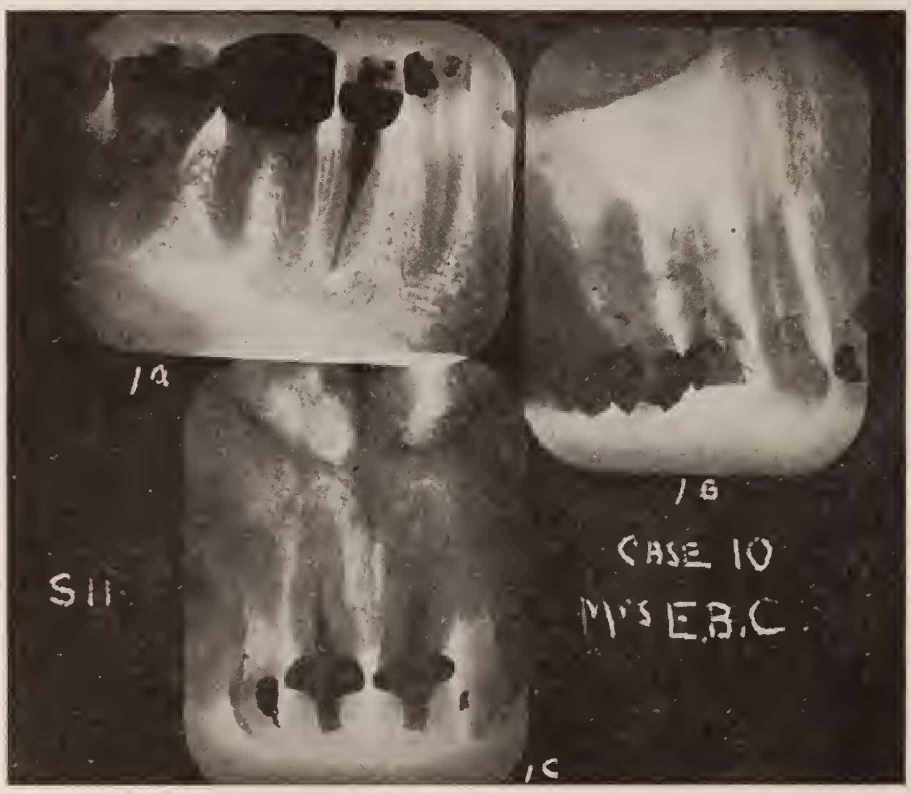
The next slide shows the roots of these teeth immediately after they had been treated and successfully filled. I will say for the benefit of the members that the first root-canal fillings inserted in these teeth probably were at the time the advocacy of mummifying pastes was at its height, and from the material I was able to get out of the roots, I was led to believe such a paste was used in this connection. You will observe that in the case of the roots of the first molar the mesial root is missing. This root was lost as the result of a broken broach which could not be removed by any process of which we have any knowledge. We all have an accident of this kind occasionally, and this is shown as one of our accidents which resulted seriously.

The next slide is of the same case and was mounted up-side down, and is presented for the purpose of showing mistakes made by two other members of our society who worked upon the same case within the past year and one-half. One of them did the root-canal work, and you will notice that this is a very much higher grade of root-canal work than that contained in the first slide shown in this case. These roots were treated and filled, using the Callahan method, and was done by one of our best workmen, and it is my belief the area which lies beyond that portion of the gutta-percha root-canal filling of the upper left cuspid is completely filled with rosin. I am very suspicious, however, of the root-canal filling in the mesio-buccal root of the first molar which supports the other end of this bridge. The other figure shows the bridge on the right upper side attached to the cuspid and first molar. The root in the cuspid was filled by the same man who filled the other roots, but the work is not so well done. Owing to some misunderstanding this patient left the dentist who filled the root canals and sought the service of the man who made the bridges. These bridges are beautifully constructed and perfectly adjusted, but you will observe on the bridge on the right side that there is at the gum margin two nodules. These consisted of cement which the operator had failed to remove and were still adherent to the bridge at the time she presented for our inspection. The criticism that we wish to offer against the work of the man who did the bridge work is not that the cement remained on one of the bridges, because it is our belief that the patient left him before he had an opportunity to remove the cement. The criticism which we wish to offer is that this man had the full history of this patient's invalidism before him at the time he made the bridge, and also had the radiograph pictures from which these figures were made at his command before the bridge was inserted, and while there is no marked area of absorption or rarefaction around the end of the root of the upper right cuspid or the left upper molar, the condition is such that we believe that it was a decided mistake to insert the right bridge on the cuspid which presented a picture such as shown here. I make this criticism because I propose to show in a later figure that some conditions which show no area of rarefaction are more dangerous than those that do.



Case 13

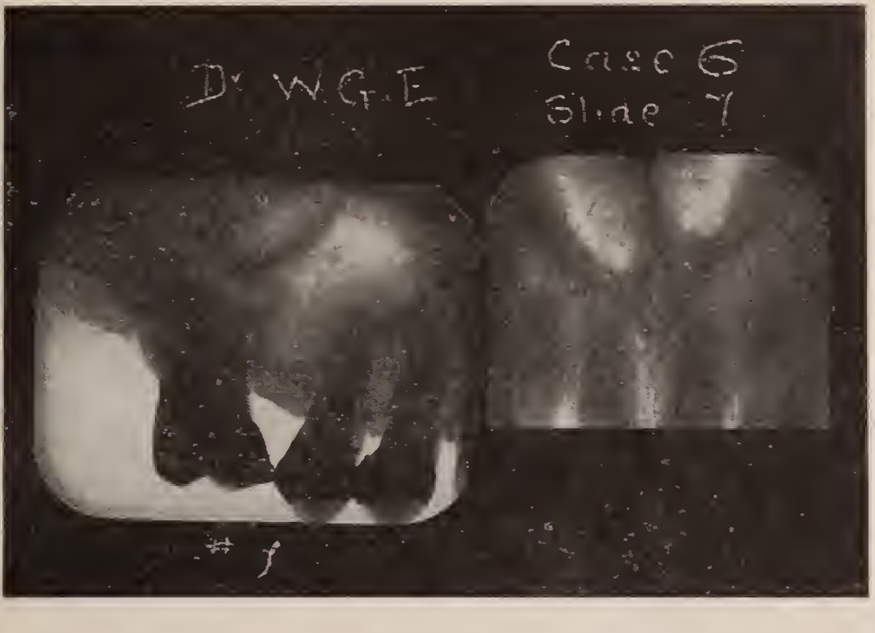
Case 10 should be marked Mr. E. B. C., instead of Mrs. E. B. C. This is a man who had been suffering a great deal with nose, throat and ear trouble; also had considerable rheumatism and was running down in health. The work in this case was done by a very prominent Philadelphia dentist, and the case was referred to me by one of our local ear, nose and throat specialists for the possibility of ascertaining whether there was any condition of the teeth which was responsible for the nose and ear trouble. This figure shows the conditions at the time the patient presented, at which time there was quite a purulent discharge from the upper left ear. Upon investigation we found that the upper left bicuspid was pulpless and that the root had been filled with some sort of paste. This was removed immediately and the root treated and filled in the same manner as that presented in former figures; that is, to the point of incapsulation, and within two weeks after the root of this tooth was filled the discharge from the ear ceased.



Case 10

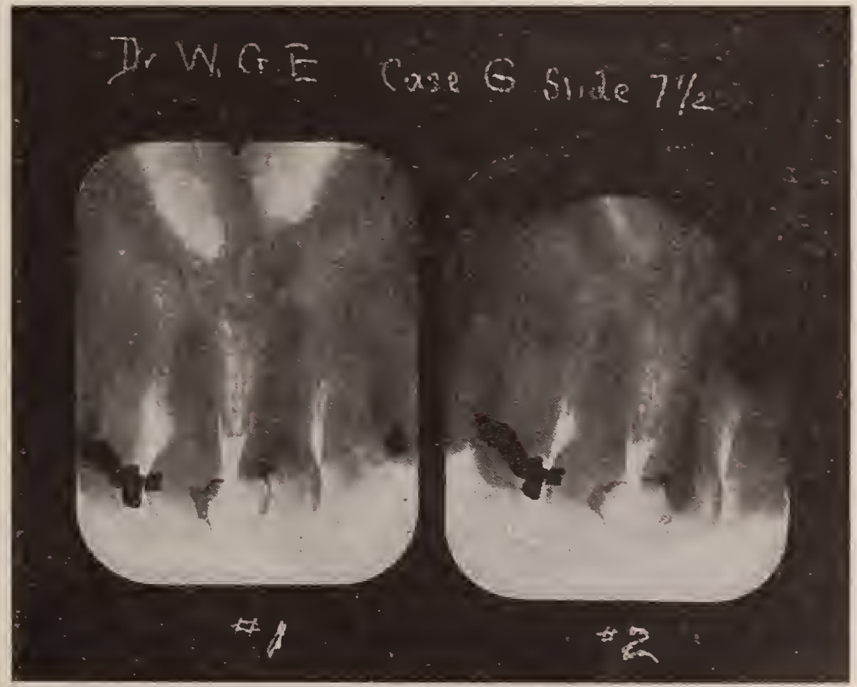
Picture A is of the lower left second bicuspid which was crowned and gave the patient quite a little trouble at times. Upon opening this root through to the apex, we obtained quite a little pus. This root was treated and filled to the point of incapsulation and up to the present time we have had no recurrence of tenderness. The ear trouble ceased, but the nasal trouble still persists, and the roots of the central incisors become quite tender at times. It is our purpose to remove the crowns and treat these roots and fill to the point of incapsulation, believing that we will be able to remove the cause of the nasal disturbance. These figures have been examined by a number of dentists and the patient was advised to let the central incisors alone, as there was not enough disturbance there to account for his troubles. I wish you to pay particular attention to the roots of these central incisors, because I propose in the next picture to show the roots of two central incisors, one of which is a pulpless tooth but which shows no manifestations whatever.

Case 6: Dr. W. G. E. This is my own case. The first figure shown is the roots of the upper left second molar, which was filled by one of our best root-canal experts in the Cleveland Dental Society, who used Dr. Prinz's method. The filling was paraffin paste, using gold wire. The operator was able to reach the apex of all three roots in the treatment of this tooth. We permitted the use of paraffin under protest, our reason for objecting being that we did not consider paraffin a trustworthy filling. Sufficient to say that we lost the tooth within two years from the time that it was filled, due to the formation of an abscess at the apices of the roots. The second figure is presented for the purpose of proving the statement made earlier in this paper that some of the most virulent cases of root infection produce absolutely no radiographic exhibits. I defy any one present to tell me which of these two central roots is the pulpless one and state his reason for selecting the individual root. (At this point Dr. Ebersole waited several moments for someone in the audience to select the pulpless tooth, but no one responded.) The next is *Picture 17½*, the same case. The first figure is the same as the second one of the last slide with mask removed, exposing both the crown and the roots. You will notice that it is the right central incisor that is the pulpless tooth. When we opened this tooth we found that the filling which had been placed in it forty years ago consisted of



Case 6

cotton which had been saturated with some preparation. Upon the removal of the cotton we found that there had been no seepage into it or any discoloration of the cotton, even at the apex of the root. We were unable to detect any odor. After the removal of all the cotton the root was treated as described in the paper just read. To our astonishment we had very marked symptoms of infection both locally and systemically, with a very marked increase of tenderness over the abdominal region. The root was immediately opened and pus was found at the apex. The canal was left open two days and another effort was made to treat and seal it, but with a repetition of the first experience. The third attempt was successful and on the fourth sitting the root was filled as shown in *Picture 2*.



Case 6

The only soreness or tenderness that I recall during the period of forty years which intervened from the time this root was filled up to the present was immediately following the two treatments just mentioned. Since this root was filled all abdominal tenderness has subsided and my health has improved wonderfully. I want you to note the fact that the incapsulation of this root is not of the same order as that I have presented in pictures I have shown tonight. This is due to the fact that the man who filled the root was a novice in this line of work and forced his gutta percha point through the apex too rapidly, not giving it time enough to soften to a point where it would readily flatten out at the end. It will have to be removed later and an ideal filling put in the canal. The final thought I wish to leave with you in connection with this slide is that this root canal harbored a very virulent micro-organism which was responsible for a good deal of systemic distress without any local manifestation, either from a sense of touch or the radiographic standpoint.

Discussion will follow in May number.—Editor.

FRACTURES AND DISLOCATIONS OF THE JAWS*

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THE PROCESS OF REPAIR

What is the function of the periosteum in bone regeneration?

Just what takes place in the behavior of the tissues in the process of repair of bone is a question concerning which there is diversity of opinion. There seems to be, indeed, an antagonistic state of opinion about the theory of bone growth. Havers, whose name has been identified with the vascular canals in bone (Haversian canals) in 1692 gave the first accurate account of osseous structure, and described the periosteum as simply a connective tissue, limiting and vascularizing membrane.

Antoine de Heyde, in 1684, published the first experimental observations made on frogs and came to the conclusion that callus was formed by calcification of blood clot extravasated around the broken bone ends. It was, however, in the middle of the eighteenth century (1739-1743), that the first systematic work on this subject was carried out by Durhamel who was the originator of the modern, generally-accepted theory of the function of the periosteum. In his view the periosteum became thickened and succulent around a fracture, and by pushing the new tissue in amongst the fragments it formed the callus. It was he who founded the term "cambrium layer" of the periosteum (a layer of cells between the bark and the wood), which now is quite extensively used.

There seems to be a wide variance in the opinions of various investigators as to the function of the periosteum in bone regeneration. MacEwen ("Growth of Bone," 1911), is emphatic in the statements that the function of the periosteum is simply a limiting membrane, and that it does not have the property of osteogenesis; and in reporting his experiments apparently has some ground for this contention. He reports several experiments made upon young dogs where a resection of a part of the whole thickness of the radius was removed, leaving the periosteum. No bone was formed by the periosteum in ten weeks. He finds failure of periosteal flaps to produce new bone.

In support of his contention that the periosteum is simply a limiting membrane, he finds that when regeneration of bone has taken place from the epiphyseal cartilage pushing the cut fragments toward the gap and the proliferation of bone cells from the cut ends of the bone (the periosteum not being intact) a marked hypertrophy of the bone occurs.

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Cohn and Mann, in *Surgery, Gynecology and Obstetrics*, 1915, reported experiments which seem to support the argument of MacEwen. Their experiments included transplanting of bone denuded of periosteum into muscle, into the medullary canal and into newly-made bone defects, covered and not covered with periosteum; the transplanting of periosteum denuded of bone around the carotid artery and the observation of periosteum left *in situ.* It was found that the isolated bone-grafts did not act as foreign bodies, were not absorbed after sixty days, and even showed a tendency to outgrowth. That grafts placed in the medullary canal or in bone defects showed proliferation and healing power; and that the periosteum left *in situ* did not show bone proliferation nor was its presence at all essential to the healing of a fracture or of a defect.

Other investigators are of the opinion that the experiments of MacEwen, Cohn, Mann and others who contend that the periosteum has not the property of osteogenesis, were carried out with the outer layer of the periosteum, while the inner layer which Hey Groves terms the "epiosteal" layer, or the osteogenic layer of the periosteum, was not considered.

Hey Groves summarized as follows: "The periosteum is chiefly a limiting membrane of the bone. The dense bone can live, grow, undergo repair, and produce fresh periosteum after the latter has been removed.

"In young bones it is possible to remove the periosteum in such a way as to produce an osteogenetic membrane, this being probably due to the lifting of the epiosteum with the periosteum. In adult bones this is impossible except after trauma or inflammation. Nevertheless, the retention of the periosteum though not necessary, is highly desirable in bone-repair, because its removal takes away much of the epiosteum and because it affords a ready means of vascularization."

FUNCTION OF COMPACT AND CANCELLOUS BONE IN THE PROCESS OF REPAIR

About this portion of the bone there never has been the same difference of opinion as about the periosteum. Ollier proved that quite apart from both the periosteum and the marrow, compact bone could live and produce new bone and undergo the callus repair of fracture. The deep surfaces of the bone, like the superficial, are capable of osteogenesis under suitable stimulus.

Quite apart from the epiosteal and endosteal layers of cells which may be regarded as originating from compact bone, Axhausen has shown that the wide Haversian canals contain active osteoblasts and favorable conditions for new bone formation. It has been observed in gunshot fractures in France that when the ends of the fragments have been exposed and bare, that by stimulating the ends by a drill, buttons of granulation tissue would be pushed out in a short time and soon would cover the entire ends of the bones. These ends could then be put in apposition and union of the fragments would result.

Summarizing, then, it can be stated that compact bone, if it has the proper blood supply, is quite independent of either endosteum or periosteum for both growth and repair.

We now will consider just what takes place in the repair of bone. The process of repair fundamentally is that which takes place in the union of the soft parts. There may be primary union or it may be secondary, i.e., by granulation-tissue, this being genuine osseous tissue. When a bone is fractured, considerable blood will be effused from the ruptured medullary and Haversian vessels as well as those of the periosteum. Also, more or less blood is poured out from all of the lacerated tissues which are immediately adjacent to the seat of fracture. In rare cases the periosteum may not be torn, but from the very nature of the injury it must necessarily be more or less stripped from the broken extremities. However, in the large majority of cases, it is torn and lacerated. Ollier called attention to the desirability of preservation of its continuity at some part of the periphery of the bone and to the fact that when a lateral or longitudinal displacement has occurred, the membrane is stripped partly off one fragment, but without having its continuity broken, and thus forms a bridge uniting the two fragments, to which he gave the name of "periosteal bridge."

The portions of the periosteum where the continuity has not been preserved are so structurally attached to the adjacent tissues that when reduction of the fracture is accomplished they undoubtedly take their relative normal position to the bone, thus forming a tubular sheath which connects the ends of the fragments. At the same time the blood is poured out into the gap between the fragments, it also is effused from the vessels of the soft parts into the interstices among the muscles, and ecchymosis results.

The injured tissues infiltrated with blood soon become invaded by leucocytes and effused blood plasma. Fibrinous coagulation takes place and the ends of the fragments are embedded in a dense, ill-defined mass of firm cellular exudate. The periosteum becomes much thicker, softer and more vascular; a thin layer of gelatinous or viscid liquid is found between it and the bone for a short distance from the edge of the fracture. In about fourteen days the effused blood is completely absorbed, leaving a firm, dense, cellular, vascularized, partly-organized mass of granulation tissue. The bone undergoes rarefying osteitis and the fracture becomes fixed. This mass of tissue has the consistency of jelly and is of pearly-white appearance. It is most abundant in and beneath the periosteum and extends between the ends of the fragments and envelops them. This is known as the "provisional callus."

At first it is composed of embryonal elements which soon become cartilaginous in those portions formed by the periosteum. Lime salts then are deposited at different points within it, and about the fourth or fifth week ossification occurs which forms a spindle-shaped ferrule around the extremeties of the fragments, providing there is little or no displacement, in which case the reparative tissue is more irregularly disposed. (*Fig. 18.*)

Simultaneous with the development and formation of the "provisional callus" similar changes are taking place in the cancellous bone. The blood-clot has become infiltrated with leucocytes. The blood is next absorbed, the connective tissue and endothelial cells proliferate, and granulation tissue, osseous in character, forms from both bone fragments. This is known as the "definitive internal callus," which soon fuses and develops into porous bone.

"Owing to the physical obstacle presented by the dense osseous tissue, the proliferation of the connective and vascular tissues occupying the Haversian canals in the compact tissues contiguous to the fracture progresses but slowly, the lime salts gradually disappearing so that it is comparatively late before the granulation tissue thus produced ossifies, definitely uniting the fragments. When union finally has been completed, the excess of external (*Fig. 19*) and internal callus is

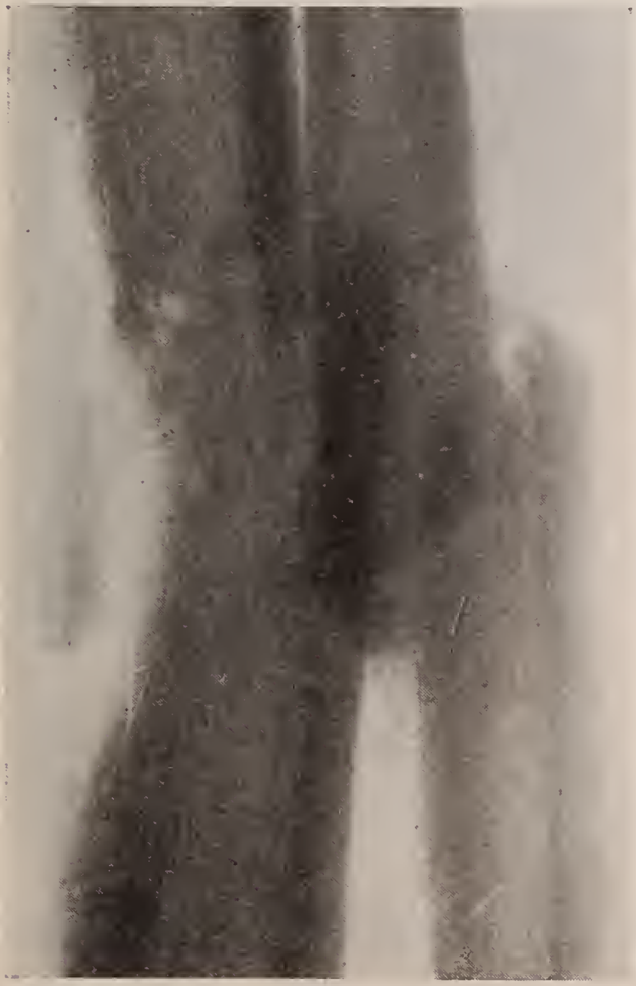

Fig. 18

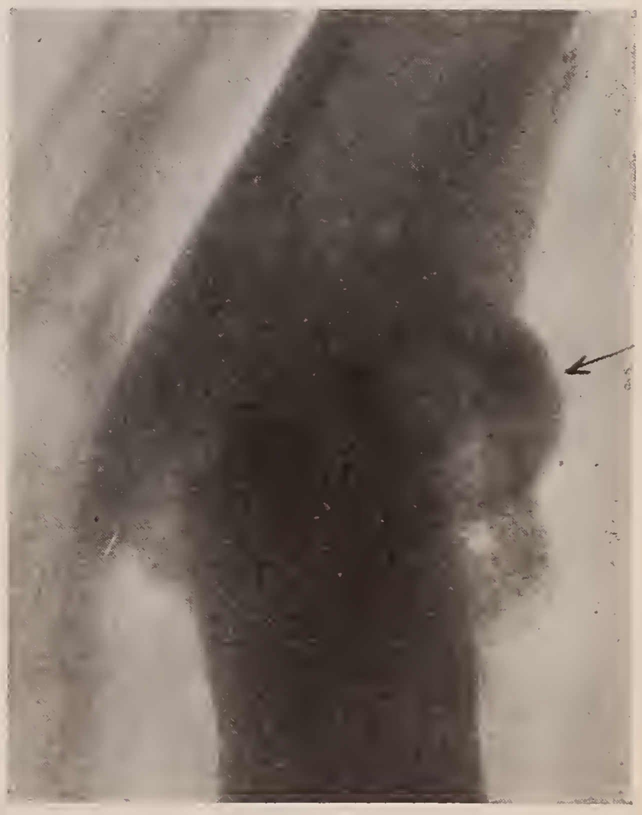

Fig. 19

absorbed and in time the site of fracture may be hard to detect if the reduction has been perfect." (DeNancreed.)

The removal of excess of callus results from the phagocytic action of certain cells—"osteoclasts." While the callus is forming and rarefying, the process of repair is going on in the contiguous soft parts and they regain their normal condition and function. Occasionally injury to adjacent muscular or nerve tissue may cause more or less permanent disability of these structures.

Fragments of the cortical layer of bone broken off at the time of the injury may remain attached to the epiosteal layer of the periosteum, preserve their vitality, share in the same processes and form a part of the callus. (*Fig. 20.*)

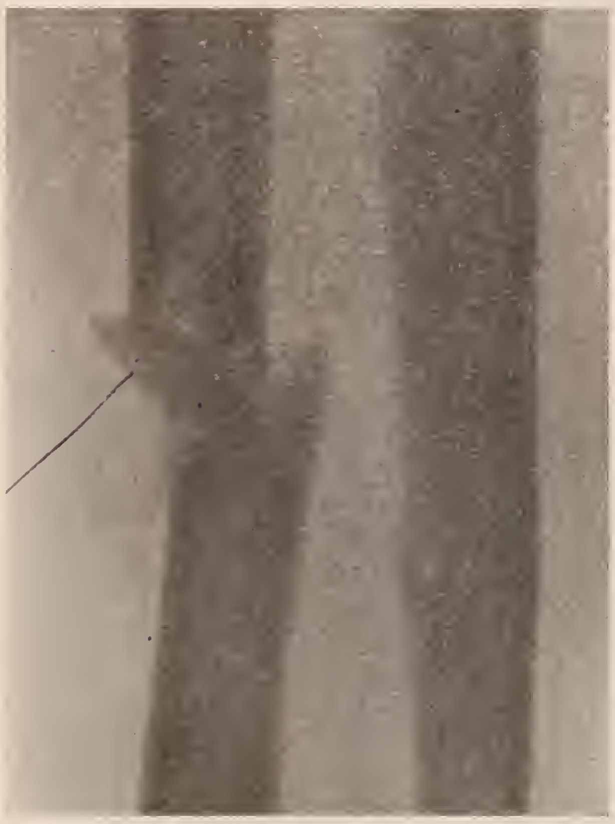

Fig. 20—Interposed Fragments

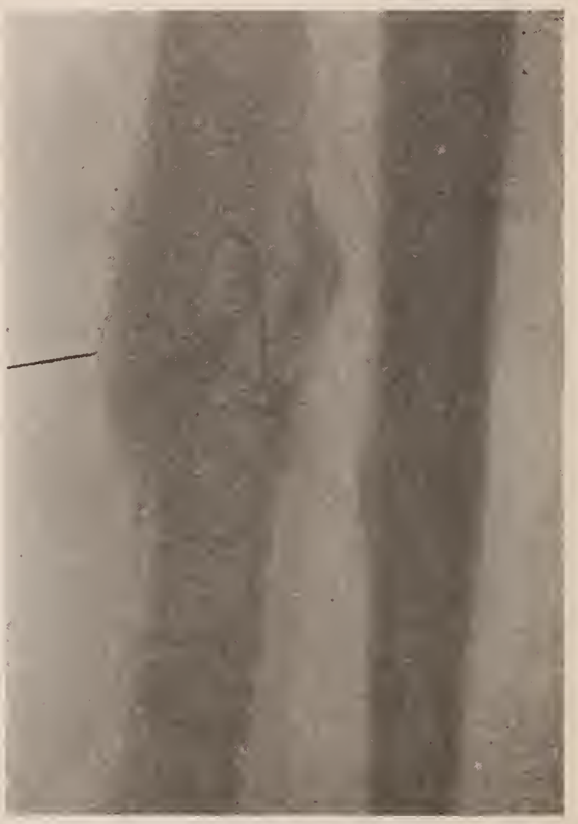

Fig. 20—Result

Occasionally there may be an excess of rarefying osteitis and a lack of production of osteoblasts, so that the callus may not ossify; in such cases the bone is absorbed for a considerable distance between the ends of the fragments. (*Fig. 21.*)

In cases of an open or compound fracture, when it becomes infected and suppuration ensues, the process of repair is slower, because the suppuration of the wound delays or prevents the formation of the provisional callus and it has to depend upon the formation of the "definitive callus," which is not so favorable for rapid repair. The callus thus formed is larger and more irregular than after simple fracture. It remains sensitive and tender for a long time and is covered by an adherent scar at the seat of the wound.

Fragments not attached to the periosteum may become engaged in the callus, and there act as a foreign body and will greatly interfere with the evolution of the callus. The detached fragments produce a constant irritation, with a resultant inflammatory and suppurative wound in the exterior. The fragment becomes a sequestrum and exfoliation must take place before the process of repair is complete. (*Fig. 10,* February SUMMARY, page 84.) Fragments that are attached to the periosteum usually will maintain their vitality and will be an aid in the process of repair.

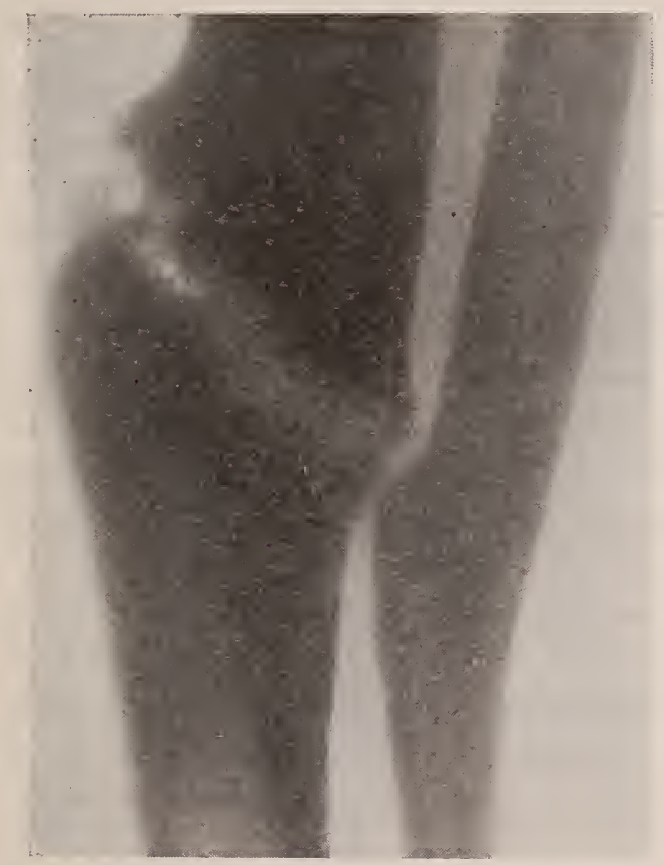

Fig. 21

(*To be Continued*)

From the epistolary information sent home from Salonica we deduce that the life out there is good or bad according to circumstances, the individual point of view, or the mood of the writer. A member of a hospital staff pluckily enlarged on the rosy side of existence in Salonica; the grumbles also are sometimes entertaining, but not often put so pithily as the epigram quoted by the *Hospital:* "They say here," writes a V. A. D., "that in the first year you lose your hair, in the second year your teeth, and in the third your reputation."

—*News and Notes, Dental Record.*

THE MICRO-BIOLOGICAL ASPECT OF SOME DENTAL INFLAMMATIONS*

BY THEO. VON BEUST, D.D.S., M.D., HARROD'S CREEK, KY.

I AM loath to appear before you without specimens to substantiate my statements. I always like to have the microscope at hand to verify my drawings. But all the slides that I possess are still in war-torn Europe, and I am therefore compelled to offer a poor substitute in the shape of rough diagrams. You will find only meagre details concerning our subject scattered about our journal literature and nothing, so far as I am aware, has ever been given in a concrete form.

A certain amount of superstition exists concerning the powers of aggressiveness possessed by micro-organisms. Microbes, to be sure, are a dangerous quantity, and should in all cases be regarded with mistrust. It appears, however, that some practitioners have only a vague idea of the effects of their presence during certain dental operations. There are some methods in vogue in dental practice to which I will call attention that justify the belief that bacteria can proliferate in the dentin in a sealed cavity. We hear with astonishment that bacteria can still fructify at an air pressure of nearly 2000 atmospheres; that the spores of some of them can resist boiling for fifteen hours; that they remain vital in ice for years; again, that pyogenic germs have been isolated from arthritic joints that have shown no evidences of inflammation for years. We see them grow in profusion in the materia alba upon the teeth; we know that they multiply with incredible rapidity in all culture media exposed to their access, and yet, gentlemen, microbes are as difficult to raise as incubator chickens. They demand for their growth conditions as clearly defined as do the majority of beings in the phylla of life. Many pathogenic organisms are extremely exacting, some varieties so much so, in fact, that we are quite unable to fulfill the requirements for their growth. In other words, all attempts at cultivation have for a goodly number proven unsuccessful. This can also be said of a number of varieties inhabiting the buccal cavity.

Two great factors control the growth of bacteria. One is the food supply; the other is the dangers of the products of their own growth. A continual influx of nutriment coupled with a continual afflux of their secretions is essential to growth in any colony. In the case of organisms that have found access to tissues of the human body a third great factor may be added. This is the resistence offered by the secretions of the host to the bacterial invasion. The alexins, the anti-bodies, the anti-ferments, immune bodies—whatever you choose to term them—are ever ready to take charge of the invaders or their products. That the resistance offered is usually successful is satisfactorily proven by the healing of myriads of wounds that must have been infected by omnipresent bacteria; it also is proven by the incapsulment of countless apical abscesses, as demonstrated to us by the Roentgenologists.

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*Read before the Kentucky State Dental Society, 1917.

Nature is very kind to the dentist. She forms cavities of decay in the teeth of mankind and after the dentist has exercised his skill in repairing her ravages, she kindly conceals from the patient many discrepancies which may have crept in while the tooth was being treated.

We all realize the fact that notwithstanding our most earnest endeavors our excavation of cavities of decay is only relatively perfect, and that our fillings are only relatively perfect; and that our root treatment rarely or never approaches the ideal. As a matter of fact, cross sections of filled teeth demonstrate to us that a perfect stopping of the tooth cavity is rarely attained. If our fillings only relatively fill the cavity, it follows that there remain unfilled areas; there remain softened areas; there remain areas with remnants of pulp tissue; there may even remain areas containing pus.

The remarks that now follow apply to the assumption that our fillings are only *relatively* perfect. There are certain responses following the treatment of a tooth, such as sensitiveness to pressure, or to temperature, or even a general dontitis, the meanings of which are not always clear. My purpose today is not to attempt an explanation of these, but to call your attention to a few points relating to the biology of the adjustment to the normal taking place in an infected cavity.

Fig. 1: In cross sections of filled vital teeth we usually find the tubuli under the fillings obliterated by a secondary deposit of calcarious tissue. This new formation we can appropriately term protective dentin. This is best demonstrated by means of stained sections. The first figure will serve to illustrate this point: (a) represents the filling; (b) the tubules. The dentinal fibers in close proximity to the filling in teeth possessing a considerable amount of vitality will be found closed by this secondary deposit, the shaded portion (c) representing the obliterated tubuli. This obliteration, by the way, also frequently takes place at the cervex where the protective covering of the dentin has been removed by erosion or pyorrhea *Fig. 2* represents this point, the shaded parts (a) showing the obliterations. This is nature's

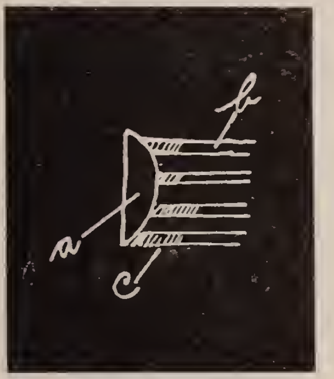

Fig. 1

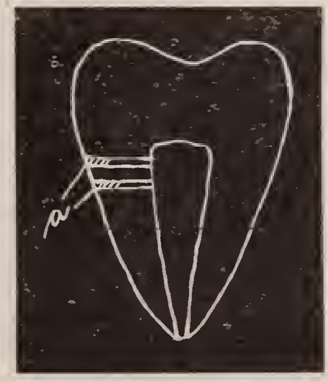

Fig. 2

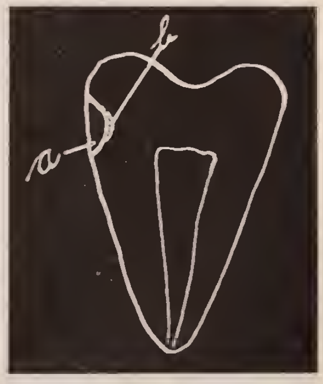

Fig. 3

response to irritation from without, a proof of active metabolism within the tooth. Nature is thus inclined to protect by means of some kind of a barrier all parts of the system, provided always that the irritant is not sufficiently energetic to act more rapidly than the faculties of resistance. There is something more than this obliteration of the tubuli to discuss in this connection. We will now throw upon the screen a diagramatic representation of a filled crown cavity.

Fig. 3. (a) represents the filling; the shaded portion (b) an unfilled crevice. Assuming that the edges of the filling are intact, we may expect, judging by some specimens in my collection, that this crevice also will be obliterated by a secretion identical in character to that which is found in the obliterated tubuli. Before passing this matter I would like to suggest that those who have observed crevices or convolutions in old fillings that have been removed, that were filled with tooth bone, would mention this fact in the discussion. I have frequently found this to be the case and cannot give any other explanation for the observation.

Fig. 4 demonstrates another stopped tooth with a crevice under the filling. The crevices here are exaggerated, of course, for convenience of demonstration. At (b) and at (c) we have infection. Assuming the edges of the filling to be relatively perfect and the infection at (b) to be one type of pathogenic organism, and at (c) an organism of another type, what takes place? A great many of you would probably shudder at the idea of these pathogenic microbes under the filling. But, gentlemen, the danger is not great; in fact, there is no cause for anxiety at all. Supposing that there should be a sufficient amount of nutrient media to enable a limited proliferation of the bacteria, the germs would soon perish by being poisoned by their own toxins. In case two or more varieties are inclosed, the least resistant would perish first or be destroyed by the others, and the remaining would quickly follow in their path. The pulp, in this case, would also respond by secretions which would inhibit or bar their ingress. A cross section of such a specimen made after the lapse of considerable time would possibly display the area containing soft deposit, but the tubules between this and the pulp would doubtless be found obliterated, if indeed the lumen of the cavity would not be found filled with a calcareous mass. It is not im-

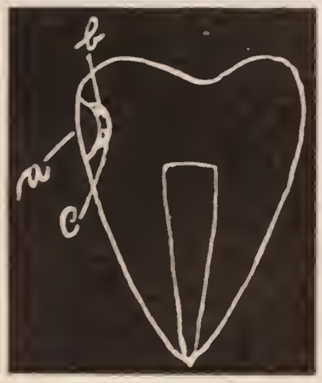

Fig. 4

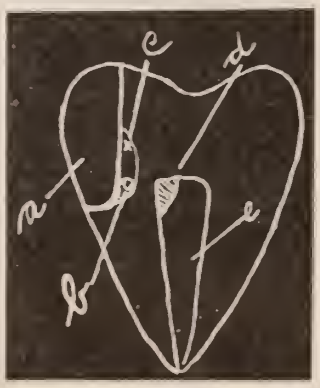

Fig. 5

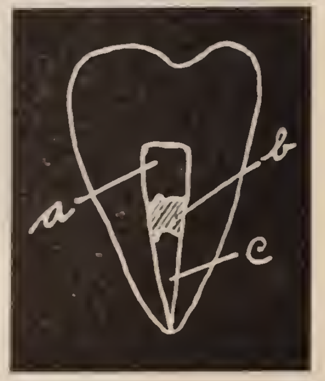

Fig. 6

possible that such a tooth would remain sensitive for a time, the degree of sensitiveness depending upon the size of the space and its proximity to the pulp.

Now it may occur that the imperfection in the filling may be so large and the distance to the pulp so small that the aggressive may exceed the protective forces. *Fig. 5* illustrates such an example. (a) shows the filling; (b) and (c) the bacteria, and (e) the pulp. Vitality in the tubuli interposed between the filling and the pulp may here become so impaired by the toxic material contained in or generated in the infected area that metabolism within the tooth is insufficient to counteract the advances. Profound disturbances will here result. Active response to thermal changes or even pericementitis may follow. The operation of filling even here need not necessarily be pronounced a failure. A barrier of secondary dentin may form at (d), and the tooth again, after a period of restlessness, assume normal conditions and give perfect comfort to the patient and satisfaction to the dentist. The barrier of secondary dentin here shown need not necessarily form at (d), although this is the common site for such formations. I have frequently found teeth where the barrier was much farther down. *Fig. 6* demonstrates such a case. At (a) we have decomposed pulp tissue; at (b) the incapsulment and at (c) healthy vital pulp.

Very likely you all have opened teeth that never have displayed visible traces of inflammation, and were surprised to find a dry and relatively empty pulp canal. We may very likely account for the death of the pulp—perhaps a blow, or a faulty filling, will upon examination lead to the history of the case; it is a matter of conjecture, however, what processes were responsible for the disappearance of the pulp tissues from the canal. The only explanation that occurs to me is that the pulp was decomposed by micro-organisms and the liquefied portions expelled by their gaseous products. The opening of a canal, as some of you doubtless have experienced, is sometimes accompanied by an audible exit of gas which, moreover, not infrequently makes itself apparent to the olfactory organs of the operator. A gas pressure of this, or much less, intensity, could easily empty the canal. It is not usual that such a process could be unaccompanied by pain; we are all acquainted with extensive pathological alterations, however, that never have given the least discomfort to the patient.

We have now progressed to a point where the inflammations involve the pericementum. Extraordinary faculties for recuperation and regeneration are embodied in the pericemental layer of the periosteum. Advantage of this fact is taken by pyorrhea specialists, also by those who practice resection of the apex. Broken-off roots may be incapsuled by a new deposit of cement.

Fig. 7 displays a broken root, reported by M. H. Fletcher in The Dental Summary. (c) represents the cementum, which has been deposited over the broken surface and even into the root canal. Longitudinally split teeth have, by a new formation of cement, been reunited. Time and again, in making sections of teeth, I have found the apex of the canal partly filled by a layer of this tissue. Now this is precisely what happens when the organism has successfully combatted bacterial invasion at the apex of the canal. *Fig. 8* serves as an illustration. A barrier of protective cement effectually prevents further infection. It would go beyond the limits of our time to discuss the biology of lesions outside of the apex of the root. What we have already discussed will probably suffice to make some of you appreciate what nature is doing for us.

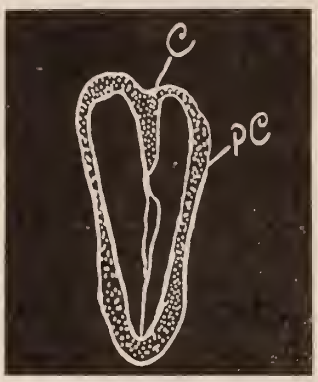

Fig. 7

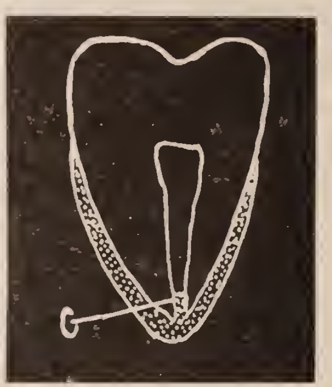

Fig 8

There is just one word that I may add concerning the treatment of superficial cavities with antiseptics—in other words, with poisons. The practitioner who applies antiseptics to superficial cavities in vital teeth is, it appears to me, destroying germs that can never develop and inflicts injury to the patient by destroying, or at least impairing, the recuperative powers with which the tooth is endowed. I, of course, agree with paper of Dr. Rose in that freshly-devitalized teeth need no antiseptic treatment. Such a practice is based upon faulty conceptions.

THE TREATMENT AND FILLING OF ROOT CANALS*

BY O. G. WILSON, D.D.S., FRANKLIN, KY.

THIS PAPER embodies some observations on the late teaching on this subject, with some unavoidable criticisms regarding the theories set forth by modern teachers of the "new school," with the difficult and practically-impossible requirements enjoined in its carrying out, with suggestions for simpler methods to be employed in this work, and submitting one of this nature that has proven both safe and sane with the writer for many years, and is within the range of most any one to carry out.

We trust that no one will misunderstand the object and purport of this paper, for we do not present it with the intention of provoking unfavorable feeling towards the commonly-accepted theory concerning this class of operations, and which has been handed to us by many of our most learned men, save wherein some of this teaching has shown an over-reaching zeal to establish a fundamental system that could be regarded as standard for work of this nature, and have taken some things for granted without a test of time to show such to be correct. In this latter reference we would state that we believe some of the things laid down as *theory* will not bear the scrutiny of a proper test, and if such shall prove true, there can be no harm but great good result for the singling out of error. We want facts whenever we deal with things of importance. We do not want fiction in any form as a governing factor to guide our hands in attempting to do operations of such importance as root-canal work in all its exacting features.

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*Read before the Kentucky State Dental Society, 1917.

But, granting that the theory offered is sound, there remains still an insurmountable barrier towards carrying it out, because the impossible is required of us when we are told that we must open all roots and fill them to their apical ends. Those who have advocated so radical a doctrine cannot themselves begin to do this, neither can any poor, fallible man, whether he be gifted with highest degree of skill or of the ordinary average. If we cannot comply with the terms, we are told to sarcifice the tooth, regardless of its importance. If such a doctrine as this shall be shown to be possible of following, or even can be complied with to a reasonable degree within the scope of its still difficult performance, there is not enough to recommend it for our adoption, if we can find a better and simpler means of saving these teeth, with less effort, less expense to the patient and less failures. If such can be shown, there is all the reason in the world for this paper, especially when we consider the value that attaches to saving all the teeth that cannot be filled to the apex.

Our desire is to help, not to hinder or to destroy anything useful or good, and if we shall have to tear to pieces anything that belongs to the teaching of the new school, or make use of comparisons that tend to do this, or if our words offend anyone, we hope you will not misjudge the object and aim of this effort to establish facts and offer something better. We feel under obligations of no lesser value to those who have given us so much that is valuable in the work already done, in bringing more nearly to a standard the character of technic needful to be learned by many who have not realized the importance of the heeding of essentials in all root work, while we call in question any matters affecting their deductions or conclusions.

We have heard of numbers, especially among the recent graduates of the schools of dentistry, who have gone out to practice this difficult method, stating that they were almost afraid to attempt it and were beset with various discouragements; especially do they seem to contemplate with great dread the result of the searching eye of the radiographer, who so well can show up frailty. There are not a few of the older practitioners who say the same thing. In view of these very things this paper is given, wherein we differ with the teaching of the later day, and offer a method of treating and filling roots of teeth which has been successful for many years and which is well known to numbers of my friends among the profession, some of whom have had occasion to note the success I have enjoyed

I realize that there is a need for this now, since, while some know as well how to treat and fill a root canal as I could hope to know, there are many who do not know, and so many new men have come into the ranks since the new teaching came into vogue that are confronted with insurmountable difficulties in this particular branch of work, and do not know the faulty theory of what they have been required to believe. I want to set them, as well as all others who care to know, right in the light of common sense and reason.

The late teaching has gone beyond all reason in declaring that the roots of all teeth should be opened up to their root ends, as well as requiring them to be so filled. I wish to refute those claims with all the vigor I can summon to my aid, as this doctrine is not only useless but is possible of more harm than could come from anything else that could be enjoined upon one who undertakes to do this work.

In the first place, there are many roots that cannot be opened to their ends, for various reasons that all are acquainted with. To make use of strong acids like sulphuric for the purpose of opening the root canals to the end is a practice that should be relegated to the "dark ages" instead of giving it to us in the light of modern civilization as a "new and improved procedure." This method is old enough, but has been of late recommended for this purpose.

We all know that roots of teeth do not bear with interference of their apical region without making the fact of such encroachment fully known to us. We also know how sure it is that we shall have trouble if we begin to open the root towards the upper extremity with any agent with an irritating character, especially when some of this irritating substance reaches beyond the area we desire to explore. Anyone who ever has had an experience of this kind surely has not forgotten it. There is that region near the extremity of all root ends that is known to be highly sensitive to the passage of any kind of instrument. Some writers have referred to this as the "sensitive zone," and it lies within approximately one-sixteenth inch or a fraction more from the root end. This territory we assert should never under any circumstances be interfered with by attempts to open up, or to close by any substance that partakes of hardness of character or form. In fact, it should be most carefully guarded in every way possible, rather than be subjected to any process, whether chemical or mechanical, towards the opening up of the same.

How are we to guard this sensitive zone when we place an acid in the root canals for the purpose of dissolving the osseous matter within the canal to a size sufficient for making the passage of an instrument possible, without the danger of some of this acid coming into contact with the region beyond the root end, and destroying the peridental membrane covering the root ends, and after this occurs the seriousness of denuding the apical end of its only nourishing and preserving medium and resulting necrosis of the bone at the end region, with its incurableness of character, and final loss of the tooth altogether? This work of opening up by dissolving of the osseous substance with acid cannot be confined to the interior of the roots of teeth alone, but must go beyond this point aimed at; and since we admit the fact of its destroying power whenever it goes beyond such region, how are we to justify the use of this means?

Again: If we make use of the reamer to go to the ends of roots, we know we are prone to go too far; if perchance there are a few teeth with roots of sufficient size to permit the use of this means of gaining access to the coveted region, we know the danger of carrying chippings or other foreign matter ahead of the instrument, and this is not safe at all to depend on. Then, what are we to do—how are we to go to the ends of roots of teeth in order to fill them to this point? Answer: *It is impossible.* Then, if *impossible*, what is there to be done with such but discard them? Had all such teeth that cannot be opened up to the ends of the roots better be removed and the owner deprived of their use for all time in consequence, without making sure that this is the best thing to be done? We do not agree that such a procedure is at all the best that can be done.

Suppose one could open all roots to the ends, why do so? Who ever knew that such was a necessary thing to do? Teeth have been saved for generations where this thing was never thought of. Men who have filled roots of teeth all their lives know this thing was never thought of with them until quite recently. But someone is ready to argue that this is no good reason, and that countless thousands of these same teeth have been for years smouldering volcanoes, perhaps have been subjecting their owners to all sorts of exposure to contagion by reason of their foci. We are in full accord with all real "progress" in any line, and we believe in the reasonableness of foci being responsible for many diseases; and we believe that many teeth are well fitted to fill the bill in this respect; but we are hard to convince that teeth that have never given one moment's consciousness of their presence are apt to be seriously affected. We do not regard this as altogether reasonable, and if we did, we must not conclude that the bulk of teeth not X-rayed are to be presumed as *foci*. Would it sound reasonable for one who was in the most perfect state of health so far as one could tell, eating three hearty meals each day and sleeping like a baby every night, and who was as well as could be, so far as one's feeling could satisfy, or be taken as evidence to prove a thing, to say that such a person could not tell that he was well until a physical examination of his anatomy was had? We doubt this somewhat, though we grant that a technical ascertainment of one's physical perfectness could not perhaps be known beyond a doubt until thorough examination was made; but we do not see how a tooth could be at all times entirely comfortable and still have a trouble of such consequence as to become a focus of infection. Teeth, when out of condition of any moment, we are sure will at some time make matters known to the owner.

We would call attention to the January *Dental Cosmos*, which contains a most timely and valuable article entitled, "Some Causes of Apical Infections," by Dr. Carl Grove, of Minneapolis. He refers to the dangers attending the use of strong chemicals when placed for the purpose of enlarging the canals, or of making use for sterilization; and after having made a careful tabulation of many teeth that had been filled at their roots, he makes the remarkable statement that "a greater percentage of roots that had been so termed 'perfectly filled' were found to have rarefied areas at their apex, while with many of those only three-fourths filled were found to be perfect in condition about their apical ends." He decries the use of all strong chemicals for the reason of their harmful effect, and says that many root areas were shown to be devoid of live bone because of the previous use of some one of these, or some *pastes containing formaldehyde*. He criticises the *matter* as well as the *manner* for reaching the apical ends, and concludes his most interesting article by making use of these significant words: "I am thoroughly in accord with any method that sets forth a technic for asepsis and careful root-canal work, but I cannot employ in my practice a method which recommends the use of chemicals and instrumentation where there is any possibility of destroying or even irritating the periapical tissue."

In his deductions as to the causes of many periapical infections he lays great stress on pastes containing formaldehyde, and warns of the danger of destroying the membrane by use of these in the root canals for sterilization, and while refusing to make use of or to recommend such, he advises the use of the "milder" remedies, because of his fear of getting the paste beyond the root through the foramina. To use his exact words: "I cannot see how it is possible to avoid forcing some of the formalin remaining in the tooth structure through the foramen in the filling of these canals, since the entire root becomes thoroughly saturated with formalin by the use of these remedies in the treatment of septic root canals."

Here we have further illustration of the danger that Dr. Grove refers to, i.e., that of "forcing through the foramen;" and this calls to mind the danger apprehended by going too close to the apical end. Here is precisely where my theory begins to loom up in the direction of safety in staying away from this area as much as possible. Here is where I make use of Blair's "Puscure" without evil results (and this remedy makes use of a modified form of formaldehyde, as we know), by never applying it but about half way up the root and using a small quantity for the purpose, with no sort of rope to press upward and do this harmful thing of forcing the paste beyond the apex, or even near to this region.

When we finally fill this root, we find all the liquid has been absorbed or eliminated, and the paste is entirely dry and semi-hard in consistency; still we generally get all of this paste that can be removed from the root and then pump in euca-percha paste which precedes the cutting off the end of the gutta-percha cone some distance below where it is to stop in the root canal with this paste ahead of it. More about this, perhaps, when we come to this matter, but we were wanting, while connected with what Dr. Grove was saying, to show how we avoid the very thing he is striving against, and that we make so *safe a use of a paste containing formaldehyde or formalin* with perfect absence of all irritation to the apical space.

As to the treatment of the root for securing asepsis where roots need this at all, and for those roots that have no need for such on account of their already being nonseptic and entirely free from infectious contamination, I have made use of most every sort of remedy and method that I could hear of as being worth a trial during the past thirty years, among them Weld's chemico-metallic method, Scherier's sodium paste and several others I cannot now recall, including several of the essential oils, some with good results, some with results I did not like, and these were all finally abandoned. I regard "Puscure" with the most favorable opinion of anything I ever tried, because I have learned to use it in a manner that insures its never-failing outcome, and it relieves all sore and aching teeth from the moment almost that I place it in the root, and what is a valuable factor further, it is the handiest and cleanest to use and will not discolor the tooth afterwards.

But going ahead with my subject, I do not care in what way asepsis is secured; there are many well-known drugs that will do this work readily, and some have one way while some have another; so I will not quibble about how this is done. But I want to make sure always that this important preliminary is secured beyond a chance for later trouble. I now come to the point of root filling, since I have controverted the matter of getting too close to the apex, but will leave all this sensitive region to itself, and will finally take care of this as we fill the roots.

Permit a going back for the further stating that when I sterilize a root canal, the entire region within the canal no longer contains a single live germ to undo the work in later life, provided this condition is retained permanently. On the other hand, if such condition is not secured permanently, there will come a time when this tooth will let this fact be known, and generally in no uncertain manifestations. Hence it is of most vital importance that teeth be safeguarded against further germ entrance to the root canals at the time of doing the final filling. This brings in the mention of the rubber dam as the only reliable means yet known for securing absolute dryness and isolation of the field we are giving attention to.

Of all the adjuncts known for aiding in the work of preserving teeth, but more especially in this class of work we are discussing, there is, in my mind, no one of such paramount importance to name, and I do not believe it possible to dispense with the use of it. I have been in arguments with my friends for a generation over this one subject, and some of them still cling to the idea that they can keep teeth dry without it, or that they can and do secure good results with a seldom use of it. I have come across some who have made boasts of their not using the dam in their practice, even asserting that they do operations without it, that I positively know cannot be accomplished either by themselves or anyone else. Whenever I come across such an operator as this, I feel like telling him what I know is so, even if I do not, in the positiveness of my nature, do this. But I will say here that all such useless boasts as these are out of place and productive of reflection on the character of the one who would not rather make a concealment of this *lacking* deficiency of which he is possessed.

I am called a "rubber damn crank" by some of my friends, and this I am rather proud of than otherwise, since these same friends know that success follows most of the work I do, especially when dealing with teeth that require treating and filling of their roots. This is not boasting for me to say this, though perhaps sounding pretty much like it, for I am not exploiting any greater degree of skill than they have, as I lay claim to the virtue that belongs to the "safe and sane" procedure I have used for more than twenty-five years, and that they, as well as all of mediocre ability can do as well as I. This method I am heralding has an unmarred record of success so far as I have been able to learn. Not one infected root canal has ever come within the range of my observation during the many years I have been making use of the theory and principle of practice that pertains to this simple method, and so long as time shall hold out to me for the practice of this work, I do not see how I shall have the heart to change from it.

But going back to the subject, it must be borne in mind that roots cannot be successfully treated but the one time; that is, they cannot be opened up again to such freedom of access to their canals after they have once been stopped up with a filling of any kind. Hence the importance of taking note of this and remembering never to fill a root canal until it has been rendered sterile beyond a doubt, and then see that sterility is scrupulously retained throughout the final procedure of filling the roots and sealing the pulp chamber with some good cement.

Our standard set for a proper root-sealing medium consists of a material that must possess that essential quality of being soft and plastic, and having an affinity for union by chemical combination with the similar material of which the root cone is composed, and should contain a solvent that is mildly antiseptic and that will remain so permanently, so that when placed within the root canal in advance of the cone of gutta percha, it will make secure stoppage of all tubules and foramina and readily unite with the cone when placed in contact with it, and thus provide a homogeneous mass that shall stick to the root walls by adhesive as well as mechanical contact, and provide a safe sealing and filling of all space for the certainty of prevention of any character of germs, and thus conserve the ultimate preservation of the root.

Euca-percha fills this bill to a perfect degree, and cannot be improved upon, if equaled by any other material that could be named. This paste is at the same time entirely compatible with the root region, giving no "offense" scarcely at all should some of it be pressed beyond the apex. This paste is impregnated by chemical incorporation with one of the best mild germicides known to medical science, and is perhaps more permanent in its character by such incorporation than possibly any other similar substance, and while exceedingly mild as an antiseptic, it exerts its power in the direction of providing immunity, by reason of its faculty for inhibiting germ development. This paste is readily prepared by taking a few sticks of the ordinary "temporary stopping" and breaking up as finely as possible, then placing in a large-mouthed bottle and covered over with a good quality of eucalyptol until the whole is dissolved into a creamy mass.

The preservative, or more properly, the conservative value of iodoform used so frequently in surgery, lies in the identical same fact of its inhibitory effect upon tissues, and no agency for providing against germ development is relied on with more certainty. I always make use of this valuable agent by blowing the vapor of iodoform into the roots of such teeth as I have removed live pulps from, and whose canal region is already aseptic, for the purpose of maintaining asepsis, and I think nothing could be better in all such cases. I make application of this gas by means of another of those inventions of our beloved fellow dentist, Dr. Blair, and which was known when I bought it thirty odd years ago as "Blair's Vaporizer." I suppose I am one of those antiquated cranks for owning to the use of one of these "stink guns," as I have known them to be called; but be this as it may, I would not today take ten times what it cost me when this one was purchased.

Bear in mind, I have secured asepsis in many and various ways, all the while I have been having success with root-canal work, and I do not lay such great stress on the way I obtain this necessary preliminary, nor the way anyone else secures this condition, but I do claim more for the character of the root filling than all else, unless it be that I should include strict means for keeping the field of operation free from contaminating influence by use of the dam. I must stop long enough to state that in many striking instances I have seen old roots of teeth long since gone to decay so far as their crowns were concerned, and ready for the forceps, and after they were split open the distinct odor of iodoform and eucalyptol was invariably present, thus establishing the fact of the permanency of these drugs for years and years. I have seen old roots that had been filled by me years and years before, and that had lost their crowns and were long since useless, but there was still visible the portion of the pulp canal containing the old root filling, and never a sign of disturbance had one of these ever given.

Do not ask me to make use of something else when I have such evidence as all this before me. I would never make use of any filling that was not of a plastic nature, for the reason that when we use such, we cannot possibly make such conform to the root walls, and this is no less important in requirement for the reason that unless we do this, we cannot rely on actual mechanical contact with every portion of the interior of the root; and unless we do this we leave space between to invite or at least afford a dwelling place for micro-organisms or their spores. I would never make use of chloro-percha for this very reason, since we know that whenever the solvent has been eliminated (and this will finally leave the mass) we have a mass left high and dry, with space left between the walls and the filling. I do not discern wherein the virtue of resinous fillings can be located, since the chloroform or other solvent used for the purpose of making it applicable to the root canals will finally leave this material open to the same objections as I have called attention to with all similar solvents. I do not believe, however, that *eucalyptol will ever so completely depart from the mass of our filling that it will be subjected to such fault.* I have known this paste to remain active so far as odor would indicate, for more than twenty years.

Why some dentists would make use of such a filling as lead or other similar hard substance I never could see; still some do these strange things (to my way of reasoning). Lead will horribly discolor any root in which it may be placed, whether or not it will do any other thing that is worth talking about. Even on the roots far up within the gum area this unsightly discoloration is oftentimes plainly visible quite a distance, as we have often noticed.

Where the pulp has to be removed alive (though I do not do this save when I cannot well help it, for the reason that so many teeth are prone to soreness for some time afterwards), we have no need, of course, of a sterilizing agency, as the canals are non-septic to begin with; but these cases call for greater care to maintain asepsis and prevention of infection afterwards than any class of teeth in this character of operations. The reasons for this are several, but mainly because of the exceeding liability to germs getting into the field of operation through the medium of instruments that are not absolutely sterile all the time of their use.

Since the dam has been referred to as a positive essential in all of these operations, I use it invariably where it is possible, and I never expect success to attend my most careful pains save when the work will admit of this adjunct. I also take a swab of alcohol and wipe the entire region of the field of operations and blow dry. Then having all broaches sterile to begin with, whether new ones or not, I open up such a tooth with care and caution as to keeping away from the cavity proper all chips and decayed matter of every sort, and seeing that the opening of final contact with the pulp is free from all debris and perfectly clean. I take all broaches from a bottle containing fifty per cent. absolute alcohol, carrying them to the pulp from this alcohol bottle, after use placing again in this receptacle. Making application of cocain is one other cause for possible infection, because there is no telling when a solution is known to be sterile. Yet where the circulation is soon cut off and the pulp removed with sterile broaches, this danger is reduced to a minimum, and need not be considered as worthy of serious import, especially when the iodoform vapor is used for drying and impregnating the root canals thoroughly, and the balance of the procedure is looked after as it should be in the secure filling of the canals and sealing over the pulp chamber with some good reliable cement. A tooth thus properly attended to will never be the cause of any sort of mortification to the operator who sees that he has done the work in this way.

I have for years made use of arsenic for devitalizing pulps, and the more I use this agent the better satisfied I am as to its value. Many are afraid to make use of it, for some cause, but I never could see why, except it was the careless manner in which vast numbers of dentists go about handling this really very dangerous drug, when allowed to come in contact with the tissues and surrounding area of bone, by failure to use the dam, and afterwards to seal all applications securely within the tooth with the best cement one can employ. Never would I think for a moment of attempting to seal an application of arsenic in a tooth with merely a temporary stopping or similar frail and uncertain character of stopping, as this character of practice is the sort that gets so many into serious trouble; and again, it is not necessary to make use of more than the smallest quantity, carefully placed at the seat of exposure and securely sealed and allowed to remain from two or three to several more days if necessary. I use what is known as S. S. White "Nerve Paste," and I am not afraid to use it at all, as there is no sort of danger accompanying its proper use. I never have seen a bad result from thousands of cases in which I have used it, barring a few exceptions where the arsenic got onto the gum; and in these cases I was made aware of its harmfulness to these parts, as the gum will always be destroyed, and more than this, the alveolus will invariably be destroyed about the underlying gum tissue, and a more embarrassing happening would be difficult to name. The way to treat such an unfortunate occurrence is to take a sterile bur of small size and bur away the necrosed septum, and the trouble will be greatly mitigated and soon be well.

I have said I am fond of the use of arsenic, and the reason for this lies in the fact of its leaving the interior of the pulp canals impregnated with the arsenic, which is one of the best known preservatives of animal substance, and I always have felt that such teeth as were treated with arsenic were more or less immune to germ life afterwards. Especially is the application of arsenic most valuable in all those cases where we cannot get into the root canals to a depth sufficient to remove all the pulp from them, and are bound to leave some portion behind that will generally give rise to irritation and sometimes severe aching in consequence, and is besides a menace to the root operation in after life because of its providing a favorable media for germ hold. We are emphatic that such leaving of pulpal portions in a root would be a serious risk to tolerate, and hence there is necessity for getting rid of all such factors for after trouble, and I do this by making the arsenic do the work that I cannot possibly do.

After arsenic has been used I know that such a root is immune from ordinary infection afterwards, and if it is impossible to remove the portions that cannot be gotten at, remove what can be and go ahead with the balance of the root filling by pumping the eucalyptol paste well into the roots and placing a cone with the end always cut off angling in form, and place this in the root canal and force the paste ahead of it, and call this done. I assure every one who hears me say it that such a root will never give trouble afterwards while time shall last. This same procedure in roots that have been putrescent and where the puscure has been allowed to remain in the root for at least a week or even longer and has in all cases been securely sealed, are treated in precisely the same way. The entire root canals, though ever so small, are as well sterilized as one would need them to be and I do not, nor never did, bother seriously with their removal. If the euca-percha paste did not perfectly fill these inaccessible and tiny canal terminals, I am sure that this makes not the slightest difference, as these canals cannot be contaminated afterwards, owing to their immune condition to germ action, because they cannot develop if, in fact, they could get to the seat of such regions.

I would emphasize the importance of the saving factor of the eucalyptol paste, as it is depended on to fill the upper portion of all root canals, and where this cannot be made to go, I assert that such teeth are none the worse off by reason of the fineness of their canals, that more than likely are already stopped up with some mass of inert, because sterile, material in contact with the antiseptic root material that will not allow development of any spores that might be in this neighborhood.

I once knew an old-country dentist who had a great reputation for treating and saving "dead teeth" and "aching teeth," and his followers were loyal enough to him to have "died by him." This old fellow told me one day that he treated teeth successfully because he kept away from the root region as far as he could. He actually did this, as I afterwards discovered, by leaving arsenic in the teeth for days and weeks, and after he removed all the dead pulp he could with readiness and without taking special pains to remove the root portions save where the roots were of good size, he merely placed a plug of cotton saturated with cresote well into the pulp chamber and filled over this with amalgam or such other material as he had a mind to use, and the job was done. This was the first opening of my eyes (then in the early practice of dentistry) to the fact that teeth can be saved many times by such crude methods. I have known teeth to remain comfortable and useful for many years with the pulp removed and a cotton plug with some creosote placed in the pulp chamber alone, and then an amalgam filling placed over all. I know that many of the teeth this old dentist treated were useful for many years, and while he now and then lost one, still in the main he was very successful. I now think that his success with the greater portion of all such teeth was due to the use of arsenic which he was prone to use in a large proportion of his cases, and this material simply left the roots in good condition for their long preservation. He was given to the use of the dam in all these operations, and for this at least he is to be commended.

I got my first "eye opening" from this crude old fellow, as I have remarked; and from having regarded it as not absolutely binding on one to fill the roots in all cases, I began the work that I feel that I am doing with success that could not be improved on by any means at hand in this modern day.

We all sometimes have the accidental breaking of a broach in the pulp canal, and after making all effort possible to remove it, we find it impossible to succeed. Again, we find that often we cannot get into a tiny root to more than an eighth of an inch, and sometimes we have been utterly unable to find an entrance to the third root of an upper molar of small and constricted diameter. In all of the above cases I have gone ahead and pumped the eucalyptol paste into such roots as far as I could, and in the case of not finding the small root now and then, I place the paste in the pulp chamber and take a piece of rubber and place behind the mass of paste and attempt to force all I can up into all the region lying in proximity to the pulp chamber; and where the broken broach is still in the root, I pump all the paste I can to fill around this and secure the root as well as otherwise. I have not in all the past twenty-five or more years had a single instance of infection that I could hear of, and I have made as diligent effort to find such as one could make. This all sounds like fiction no doubt to some who may hear it, but I stick to the story all the same, since I have told it. If I am "off my trolley," I do not know it, and so run on just as well without it.

I have forgotten to make mention of the fact that I have known of instances where arsenic was left in roots of teeth for years and never gave the least trouble, though I do not approve of this, since in most cases there will be a soreness of the tooth to follow the death of the pulp, and at this time it is better to remove and fill the roots and the tooth. But nothing need be feared very greatly from a neglect of this matter as a rule.

I also have known teeth to retain a treatment of puscure for a very long while, by reason of sheer neglect on the part of the patient, and no trouble ensued; but I do not think it wise to depend on the initial treatment for the permanent keeping of the root in good condition, as I prefer always to remove as much of the adherent mass and follow with the eucalyptol paste and then fill with the cone of gutta percha to insure permanency of the operation.

Where pulp stones impede the way to open up roots, I have found an excellent practice to consist in taking a bur and dividing the mass and then prying out one section and then the other, which in a very large number of cases can be done readily. After this, we can gain all the access that could be had without its presence.

Where I meet with teeth that have been re-infected and require re-treatment (though this has never occurred in a single case of my own work) I remove all the material that the root has once been filled or partially stopped up with, and make the best of this operation possible by application of puscure to the entire root and seal it in place for a couple of weeks to try to destroy all infection by the slow though impeded action of the gas arising from the paste, and in time permeating the root structure. But as I've heretofore said, this re-treating is always observed, a root once filled with any mass or material that is to be again removed, is a difficult as well as an uncertain matter and being so, we should make sure that it is done safely at the time it is first attempted.

No root should be filled before it is known beyond doubt that it is aseptic and ready for the filling. This can be determined by giving at least a full week's time to all putrescent teeth where the puscure is relied on, or any other means is used, *provided that in all cases of making application to a root of any sterilizing agency, the cavity of entrance to the tooth root shall be tightly sealed with some good cement of permanent character.*

It is shameful to contemplate the practice that some pursue in these instances, of placing some soft, or at best, temporary material within the tooth for a sealing of the cavity against not only seepage of the medicament so used, but of the ingress of harmful contaminations to jeopardize this important work. Such practices make the work not only uncertain in all cases, but cause many failures. When I seal a tooth I want to know it is sealed beyond any doubt, and this I do in every instance.

There is never any reason for making but one treatment of a root, no matter how putrid it may be; hence it is useless to "treat a tooth to death" as some are given to doing. There is but one kind of a root trouble that I can think of that calls for a second treatment, and this is the case of active abscess with pus in abundance. In such I open up the root canal by going directly towards the point of entrance and allow the tooth to drain for a day or two. After this time I pump into the root some of the puscure and immediately seal the cavity, and never allow this seal to be opened into until I do so for the purpose of filling the root. From the mere fact that a tooth will tolerate a tight stopping up of the entrance and remain free from ache or other irritation, but goes on to a state of comfort and remains so for a period of at least a full week, I may know that such has become sterile beyond a doubt, and at this time it is plainly evident that no more treating is demanded and the root is ready for the root filling. If such teeth go considerably longer than this it matters not a bit, but I do not consider less than one week sufficient for a certainty, as experience has taught me. As soon as a root has been filled and the pulp chamber has been sealed on top of this, as a further additional precaution, the tooth is ready for any following operation that is necessary to do towards the completion of the work of preservation, whether it be that of a crowning or filling operation.

With teeth with a chronic fistulous opening, but one sitting is ever necessary in any case, save where there may exist dead bone or necrosed root. In such latter cases there is no telling how certain the outcome is to be; but with roots or alveolus that are not diseased beyond ordinary infections, I say one sitting is all such should ever require, provided they are handled as I do, which consists of opening up the tooth to the root canals and pumping a mixture of equal parts of iodin and creosote through the root out through the fistulous tract. Seeing that this effect is secured, I am ready to fill the root in the usual manner, and afterwards go about the filling of the tooth proper. I use compressed air in my practice and will stop to state that if I had to rely on hand chip blowers I would go out of the business. I get this result by reason of the force that can be employed for blowing the fistulous tract open and carrying all fluid secretion out, while carrying the medicament behind it. When this has been done, the tract heals up promptly in the course of a very short while, as a rule. Where dead bone is present it stands to reason that healing of the fistulous tract will not ensue until the sinus is burred out to the extent of the removal of necrotic area. This can be done almost painlessly by a cocaining of the gum area about the region of this operation. Such root troubles as these are the only ones that call for going to the apical region with the preliminary treating before the filling, and since this area is so charged with noxious contamination, with exhalations from the root's interior, it becomes necessary to resort to active means to relieve the diseased area which has gone beyond the root end, and must, of course, be treated at the sinus through the bone material, as this is the active seat of the existing trouble at this time. The iodin and creosote will do the work of destruction to all chronic remains of this long-time existing condition, and establish a better order of things within the root canal that will enable a prompt filling of the root, while securing a condition of asepsis at once, and which is perpetuated for all time by the use of the euca-percha compound that prevents a reinfection of the root, while the fistulous tract will naturally heal of itself (if not complicated with necrosed bone) by reason of the elimination of the cause that existed within the root.

I would condemn in unmeasured terms that practice that not a few are given to, in the matter of placing within the root of a tooth such agencies for evil as carbolic acid, since there could be scarcely a more harmful one employed, as I think; and how anyone can find any reason whatever to support the use of this drug, I cannot imagine. There have been many warning given from time to time by writers and teachers as to the careful avoidance of this particular and dangerous drug, yet it is not infrequent that we run across some who seem to like to make use of it.

I know of no surer means for setting up trouble of the most serious nature within the apical area, by reason of the destructive action of its contact with membranous tissue, and I firmly believe where such condition has been brought about, that such tooth is doomed to destruction and had as well be removed from the mouth at once. The reason for this great damage to the peridental membrane lies in the fact of its exceeding thin and delicate structure, which renders its destruction a matter of certainty, since the burn from its contact is sufficient to extend through and through so light a substance; and when this membrane is destroyed, no possible means is yet known to induce repair of the injured bone about the root, and necrosis of the end of the root must result as a sequel, with necessary loss of the tooth.

DISCUSSION

Dr. Rivers: I feel that Dr. Wilson has presented very ably one side of the question. He is a truthful man and would not tell anything that was not true. The question that presents itself to my mind is whether the results that Dr. Wilson has gotten by the method that he has employed are as he thinks they are. We are being taught that the results of faulty filling of root canals can't be determined except by the X-ray. Now the question that comes to my mind is, have the results gotten by Dr. Wilson been verified by the X-ray, or are his results like some of the rest of us—if he don't know of any trouble, the trouble is not there? We are being taught that the filled root canal may be the focus of infection and we may know nothing about it. The statement Dr. Wilson made that a man ought to know whether he is well or not sounds reasonable, but physicians tell us that some men are suffering from very vital diseases and do not know it.

Dr. Harrington: I have listened with a great deal of interest to these papers. I think that Dr. Wilson thinks that he is right, but I don't think the doctor is right in some of the statements he makes. I assure you that at times all of us are misled. I had a fistula that occurred on the second molar of the lower jaw without my knowledge, and I ate three meals a day and thought I was well. So the doctor is evidently wrong in the statement that when a man feels that he is well, he is so.

There is just one little point that will probably be of help to our patients. I used to be an extravagant advocate of the rubber dam. I dammed everything that came into the office. I say to you that I have not had a piece of dam in my office for six months I believe in the use of the dam for certain conditions, but the use of an appliance that dentists can equip themselves with will serve to keep the field of operation dry, absolutely dry in the great majority of cases. Why inflict pain on your patient with the dam when the thing can be done without the use of a dam just as well?

About the idea of sealing over the pulp chamber: Why not fill the pulp chamber with cement instead of sealing it over after filling it with gutta percha? Gutta percha is certainly not as good a barrier as cement and a pulp chamber sealed with cement is certainly better filled than one filled with gutta percha and then filled over with cement.

Dr. Pirtle: I agree with Dr. Wilson in some things, but I can't agree with him when he said that a gutta-percha cone could not be removed from a tooth and that tooth properly treated. I know it can be done.

Dr. Stacy: I enjoyed both these papers very much. There is just one little point about Dr. Von Beust's paper. He said that he could seal bacteria in a cavity and that they would not live but die from the affect of their toxins. That recalls something I read about fifteen years ago, I can't recall where or who the author was, but it was about sealing cultures in cavities for treatment. Will Dr. Von Beust kindly set me straight on this?

Dr. Torsch: I wish to agree very emphatically with what Dr. Wilson said about the use of the rubber dam in the treatment of diseased teeth. I believe a great deal of his success is due to the use of the rubber dam in the treatment of teeth, and then sealing the canals with cement after they have been filled with medicaments. I believe absolutely that Dr. Wilson is sincere in the use of this method of treatment of root canals. We are all anxious to solve this problem. I believe there is a great danger in opening up these root canals too much. I believe there is a happy medium we should all strive to reach. I believe that in case of obstructions in canals, instead of leaving it there, if Dr. Wilson had gone just a little further he would have found that there was just a slight obstruction for a very short distance and that beyond that there was a fairly large canal opening.

I should just as soon leave the pulp in a large canal as in a small canal. I believe Dr. Wilson leaves too much to the medicament. Some medical man said that he saw a negro man's leg that had an abscess that had been treated with iodoform, and when he opened it up the pus and iodoform came out together. So we are laying too much stress on what might be called a perfect antiseptic. I believe we can safely take the words of Buckley and others who have investigated these subjects that there is no such a thing as a permanent antiseptic. I thank Dr. Wilson for bringing this to us, and I think his success is due more to his technic than to the medicaments which he uses.

Dr. Wilson: I knew good and well when I read this paper that I would stir up something. I read and studied everything that I could find on this subject, for I was well aware of the fact that I was going to strike a good many "snags." Now, I don't possess any extraordinary amount of ability, and there are those who do. Our theory has gone to an extreme now, and of two evils why not choose the lesser? We all know of the harmfulness of too many Dicks and Harrys trying to get to the ends of the roots and cleaning them. I made a statement that probably I should not have made, that is that teeth that were comfortable should be well. A man might just be in the issue of infection and not know it. But I say this, that some of the teeth that

I have treated, in fact, a large bulk of the teeth I have treated, would have had to be extracted had I not treated and thus saved them for many years to come. I say that of two evils we should choose the lesser. Dr. Harrington spoke about cementing gutta percha in a canal. I would not use gutta percha in a root canal unless I used eucalyptol along with it. When you put this solvent in with it you preserve it. Cement will absorb the secretions. Some of my work may have developed focal infections, but which is the lesser evil?

Dr. Von Beust: I merely wish to state that I am acquainted with the experiment of sealing bacteria in the cavities of decayed teeth, which Dr. Stacy spoke of, but I have never seen it duplicated. Decay is impossible under the circumstances I mentioned when the cavity is sealed with the filling. There is nothing upon which the bacteria can live. And there must be a sufficient change of fluids to rid the bacteria of their secretions in order that they may live—this is impossible when the cavity is sealed with a filling.

CHLORO PERCHA DOES NOT RADIOGRAPH

BY W. CLYDE DAVIS, LINCOLN, NEB.

While doing some research work, relative to root-canal fillings, and focal oral infection, I was struck by the large number of root fillings I had personally placed which showed a healthy apical region with the root filling only one-half or two-thirds of the way to the apex, the remaining one-half or one-third showing as though there existed an entirely unfilled canal which appeared of easy access, yet small.

I therefore did the following experiment, which I would advise every radiographer to perform to prove up my findings.

I prepared four small straight root canals, as found in lower centrals. I broached them with a small reamer until the broach would protrude slightly through the apical end. I flooded the canals with eucalyptol, then pumped into the canals chloro percha as used by dentists generally for the past thirty years. This was pumped into the canal until it formed in a ball beyond the apex. A canal point was forced into the canal one-half the length of the canal, the canal point having been previously measured and cut to one-half the length of the root. The excess chloro percha was then wiped off the end of root.

These roots then were waxed lightly to the face side of a film and exposed full time, at the usual distance. The result showed nothing in the apical half of the roots, while the canal point showed up clearly for the portion it occupied. The above easily is proven, in which case I would like to ask how much does the radiograph show us about the presence or absence of root fillings placed these thirty years?

I am at present using a radiodescent chloro percha made by adding eight grains of bismuth subnitrate to each drachm of chloroform before dissolving in the gutta percha.

Dentists and radiographers better try this experiment and stop to think a bit before they diagnose "no root filling," when the apical third seems open in the Roentgenograph.

INFLUENCE OF MOUTH INFECTION ON LOCALIZED SYSTEMIC DISEASE*

BY ALONZO M. NODINE, D.D.S., NEW YORK, N. Y.

THIS EVENING I realize that I am speaking to three groups of people: First, patients of dentists and patients of physicians; second physicians; third, dentists. It is not very often that we have these three groups together, when we may close the doors and talk to them face to face. These three groups are linked in a triangle of responsibility. Each of them is responsible to the others to a certain degree. Keep in mind this idea of responsibility for a minute.

The barber's pole was the sign of the surgeon for a long time, when the surgeon was surgeon and barber too. Years ago the surgeon dissolved partnership with the barber and started to work for himself. The barber, seeking a new partner, took up dentistry. Then the two professions were practiced together for quite a while. After a time the dentist dissolved partnership with the barber to practice his profession by himself. Again, the barber in seeking a new partner, finds the manicurist.

Why did the surgeon dissolve partnership with the barber? Because he reached that stage in his development wherein he realized that he had personal and particular responsibility to his patients. That responsibility was to conserve their health and preserve their life. The barber had no such responsibility. There was no reason for their partnership to continue. The surgeon realized that his art was not a decorative art, but an art that had to do with conserving people's health, repairing and improving their bodies and preserving their life. Because the surgeon has shouldered these responsibilities he has reason to aspire to a high standard of excellence in his art, and esteem in the community.

The dentist is arriving at a like stage in his development. He is realizing that he, too, has a great responsibility. This is realized not only by himself but also by the community at large. He is responsible for the discovery of certain hidden causes of disease and their eradication. Well-informed people realize that the dentist has this very new and important responsibility. With this understanding comes the realization that the dentist is depending upon the physician and the physician upon the dentist for the accomplishment of this result, and for the conservation of their patients' health and lives.

These hidden causes of disease are called focal infection. And focal infection is the technical name for those little areas of disease which are the source from which germs are carried to other places to cause disease or death of organs or tissues or poison the system generally. These focal infections are assuming an important place in medicine.

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*A lecture before the Golden Jubilee Meeting, Tennessee State Dental Society, 1917.

Where there is a polluted well, the pollution or infection trickles through the crevices of this polluted well. It is disseminated throughout the community to spread disease and death. These focal infections, these wells of pollution, these little disease-producing spots, have their poison and disease germs distributed throughout the system. Where there is one of these areas of pollution on the end of a tooth, for example, this pollution, this infection, is distributed through the entire body by means of the arteries, the veins and other means of communication. These little focal infections, these little abscesses, within the last four or five years have come to be looked upon as one of the most frequent sources from which the rest of the body is poisoned. They are little painless cesspools, of which we are not conscious, and which neither the dentist nor the physician can see except when the X-ray is used. These abscesses are not necessarily small, for some times they are as large as an egg. The X-ray picture then shows a little shadow around the ends of some teeth or in the jaw bone. These little shadows are the evidence that these hidden wells of pollution have destroyed the bone and are poisoning the system.

Until a few years ago the dentist looked upon teeth as teeth. You looked upon teeth as teeth, and so did surgeons and physicians. The teeth had no particular significance or relation to the rest of the human organism, neither influencing health nor causing disease. But within the last few years a new conscience regarding teeth has come to us, a new conception of teeth. We realize that the teeth are a particular and peculiar source of trouble when they are diseased, and a great influence in preserving health when they are sound. So physicians, in seeking the causes of many diseases which they did not find, have come to the conclusion that diseased teeth are a great menace in causing certain diseases, and sound, disease-free teeth a great help in curing them.

Some physicians today say that dentists and physicians have claimed that the teeth are the cause of nearly all ailments. I have not heard any one make such a claim, and I don't believe any one else has.

Some physicians, after looking in vain for a cause of certain diseases in their own field, come to the conclusion that diseased teeth are the cause of the trouble, and will send the patient to the dentist, expecting him to find the cause and then eradicate it, even before the physician has properly examined the other parts of the body. Then there are other physicians who will consult with the dentist to discover, if possible, if the teeth are the source of poison when patients have, for example, that deforming disease of the joints, or heart disease, or something is the matter with the liver or kidneys. The physician may say that he has been unable to find the cause of the trouble, although he has examined the patient thoroughly. So he takes the matter up with the dentist. The X-ray is used to see if there is anything the matter with the teeth. They will look over the patient and then they may arrive at the conclusion that the teeth, perhaps, are causing the trouble. This is the proper stand for the medical profession to take, and one in which the dental profession should closely co-operate, for in consultation they may discover these hidden causes.

What diseases do these little blind cesspools cause? A man in North Carolina, employed by the Bell Telephone Company, was taken ill with insomnia. He could sleep very little nights. He had severe pains in his head. He went to a nose, throat and ear specialist to be examined, and then went to a hospital. The nose, throat and ear man thought there was trouble above the eyebrow, in what is called the frontal sinus, and a friend of mine was called to make an X-ray examination. When my friend looked at the X-ray pictures, instead of looking at the cavities above the eyes, his attention was drawn to the teeth in the front of his mouth. He took other X-rays, and immediately saw the cause of trouble. He extracted those teeth, and a large amount of pus gushed out. The next night he slept four hours; the third night he slept well. In the meantime he received no other treatment. The Bell Telephone Company called up my friend, knowing the man was under his care at the hospital, and asked him if he thought this man would get well; if he thought he would, they would keep his position open. My friend said: "Keep his position open until Monday morning and I think he will be back to work." He continued to improve, and Saturday (the teeth had been extracted on Tuesday) my friend said, "You can go back to work Monday morning. You won't be strong enough to work a great amount, but you can go there." The man went to work that Monday morning. He received no other treatment except the removal of those teeth in the front of his mouth. This shows the importance of three things: First, that the nose, ear and throat man was unable to account for this trouble; and second, the value of having the X-ray pictures taken; third, the disease and destruction diseased teeth may cause.

Just before I went away last summer a man was turned over to me for X-ray examination; his complexion was a peculiar color. I said, "Do you feel well? Are you all right?" "Yes." His color was a leaden color. I examined his teeth with the X-ray and found two or three little cesspools. These were then eradicated, but his color did not improve. Then I sailed for France. About a month afterward I received a letter from my assistant stating this patient had died from heart disease. I cannot prove that that patient died from those diseased teeth, but diseased teeth and heart disease are found so frequently together that I am convinced that this man had been poisoned for years by those teeth, and the poison had gone through the arteries and poisoned his whole body and finally his heart.

In Alabama a short time ago a man came to one of my friends and said he wanted something done to his teeth. My friend examined them and said, "You must have this done right away." The man said, "I am too busy; when I get my crops in I will have it done." The dentist said, "You must have it done at once or you will regret it." That was in June; the work was not done then. In October the man was dead. He had died of poison—poison from his teeth. He had a very bad case of Rigg's disease.

There was a man in Missouri who died recently, and in his certificate of death it was stated he had died of poison from Rigg's disease, caused by discharge of pus from the gums. Now these are not imaginary cases; they are real cases.

Two years ago a lady came up from Cuba. She went to Wisconsin and then to New York. She could hardly walk. She had tried all kinds of shoes. It is hard to connect your feet with your teeth, but the association is there, nevertheless. She was sent to me; her teeth were radiographed and there were many of these little hidden cesspools. These were eradicated, although it took nearly two years to do it because she was continually traveling between New York and Havana. I forgot how many pounds she gained in weight, but now she can walk as well as anybody, and she attributes it to the fixing of her teeth. That is all the treatment she had.

In New York City Dr. Eppstein is connected with a hospital for diseases of the joints. In this hospital were two old people with those terrible diseased joints. Physicians could not find any cause for the trouble. How did they cure them? Did they give them medicine, or did they just wish they could get well? No; they extracted some diseased teeth and cured them.

Dr. Potter, of Columbia University, New York City, has given a list of thirty-one diseases to which these dental disorders contribute. Some of these are systemic, and some which affect particular organs or parts of the body, and their existence, their source, is laid at the door of these little blind abscesses.

Dr. Lane, of Omaha, found in examining his patients that in a certain skin disease eighty-five per cent. had these little disease cesspools or foci of infection. And he found further that this peculiar skin disease disappeared with the removal of those diseased teeth.

So each year we see the value of good dentistry increasingly appreciated, and patients are expecting better and still better dentistry, because it has been found within the last few years that poor dentistry produces these things I have just mentioned.

The importance of dentists in health conservation is now appreciated by the public at large, by the physicians, and it is beginning to be appreciated by the dentist himself. The dentist realizes he is of some importance in the conservation of his patients' health. The dentist is having a responsibility placed upon his shoulders. People realize that something has been done in the past that was wrong. The dentist did his work to the best of his knowledge at that particular time, just as the physicians did, but the world moves. The dentists realize that what they did then was wrong. This is true of the physicians also. But the physicians are fortunate, perhaps, as far as they are concerned in this, that their mistakes are all buried. That is not so with the dentist. His mistakes are howling monuments of what he did not know. When the X-rays are now produced we have to witness the horrible mistakes we made in the past. The sooner we correct these things the better. So we see that dentistry, as practiced some years ago, instead of being a benefit in many cases was a detriment to our patients' health.

We have found that many cases of heart disease were caused by these little germs coming from diseased teeth. They have traveled through the blood stream to the valves of the heart. Here they created an irritation causing an ulcer; the ulcer weakened the valves, and the valves gave away and the patient died.

There was a physician in London about to be operated upon for appendicitis. He had a diseased root in his mouth and he said to himself: "I will have that taken out before I am operated on." He had the root taken out and had a vaccine made from the germs at the end of the root. Then his appendix was removed, and when they examined it they found germs in the appendix and those on the root of the tooth the same. He also had an inflammation of his large intestine. This was a chronic condition. They treated him for that inflammation with this vaccine from the germs of the teeth and the appendix. They cured that. He also had chronic catarrh; after a long treatment that was cured, too. This physician was satisfied that the tooth caused his appendicitis.

In the light of our present knowledge of the influence exerted by these diseased teeth, we look upon artificial substitutes that have been placed in the mouth with a great deal of suspicion. Because these artificial appliances are found to attach to diseased teeth. Many of these substitutes should not be there. They were the best we knew at the time we put them in, but dentistry has developed tremendously since that time.

We find that ninety-five per cent of the teeth from which nerves have been removed, or attempts been made to remove them, or attempts made to fill these roots, are not filled. Unfortunately, it has been found necessary to kill nerves in order to use artificial appliances. In seventy-five per cent. of those cases we find little abscesses; and then we wonder why so many people are ill. What causes these little disease areas, these little abscesses? you ask. There are four prominent causes. First, a tooth may decay to so great an extent as to expose the nerve and cause disease and death of it. This disease, when it is carried through the root end sets up an infection there which produces an destroys the bone. Second, the failure to completely remove a diseased nerve or nerve killed by artificial means. Third, the failure to completely fill the nerve canal with an imperishable material. Fourth, the failure to take such precautions in filling such canals so that no germs are introduced into or through the end of the root. A physician said: "I have been treating patients for years. Now, in eight out of ten patients whom I have treated recently I did not get the results I wanted. I sat down to my books to see if I could find what the trouble was, I read that diseased teeth were the source of so much disease," he said. "that I have come to the conclusion that diseased teeth and these poor artificial substitutes have been neutralizing my efforts in curing my patients."

Another interesting thing: One woman out of seven and one man out of eleven, at the age of 35, die of cancer. An average of 73,800 deaths occurred from cancer in the last ten years. In New York state in 1913, 9528 deaths were caused from cancer; nine times as many deaths as from typhoid fever! In twenty years the death rate of cancer has increased 166.6 per cent., and if this death rate continues for the next twenty years, it will be greater than the death rate of consumption. Estimates indicate that from nine to twenty-six per cent. of all cancers are found on the tongue. Most of these cancers are on exposed surfaces where they may be discovered early, operated upon and cured. In the charity hospital of New Orleans, fourteen per cent. of deaths from cancer are from cancer of the mouth. You know that Gen. Grant was warned for a number of years that he should have a broken tooth attended to. He did not take care of it and he died of cancer of the tongue.

8 West 40th street.

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TOOTH BRUSH PARADE IS IMPORTANT MILITARY DUTY

Before the dentist gets to work on the Anzac trooper's teeth, said trooper must parade to the prophylactic bench and give his teeth a good scrubbing.—*British official photo*

168591 F C. Copyright Underwood & Underwood, N. Y.

DENTAL PARADE ON THE WESTERN FRONT

Good care is taken of these Anzac soldier's teeth and at stated intervals they line up for dental parade while the dentist inspects their mouths.—*British official photo.*

Preparedness League of American Dentists

Reports, News and Notes

The Preparedness League of American Dentists has now become the recognized medium for carrying on the work relative to the preparation of our men for service prior to their entrance to training camps. It is with pride and a sense of deep satisfaction that I refer to the splendid organization of the League in this particular department of our activities and I sincerely commend the efforts of those who have given material assistance in bringing about this situation. A development deemed most advisable was the appointment of a Director of Publicity to which office Dr. R. Ottolengui was duly elected.

The month of March is the second anniversary of the formation of the League and indicates the advantage gained by early organization for the promotion of the great work it has undertaken.

We are pleased to announce the personel of the officers of the League elected at our last regular meeting: J. W. Beach, president; O. U. King, Chicago, vice-president; H. C. Brown, Columbus, secretary; L. M. Waugh, New York, treasurer; Lieut. W. A. Heckard, New York, honorary executive secretary, and Chas. F. Ash, New York, director general. J. Lowe Young and Leland Barrett are members of the finance committee, and the sub-committee on Preparedness League of American Dentists, committee on dentistry; Council of National Defense, consists of J. W. Beach, chairman; J. A. C. Hoggan, Chas. F. Ash, W. D. Tracy, F. M. Casto, D. M. Gallie, M. B. Eshleman and L. L. Barber.

J. W. Beach.

REPORT FROM DIRECTOR GENERAL

We are receiving many letters in which the writer says he has sent in his dollar but has not received his button. Owing to the large number of applications received, running into the thousands, it requires considerable time to tabulate their names and get out the akcnowledgments. Also, there are not enough buttons on hand and more have been ordered. We ask indulgence in this matter.

I am enclosing herewith, also, the list of states showing the order in which the printed matter has been mailed. This list will show the extent to which we have endeavored to get into working order the details of the system. In this way the director farthest removed will receive his materials and supplies about the same time they are delivered to the nearby states.

Porto Rico, Alaska, California, Washington, Oregon, Montana, Idaho, Wyoming, Nevada, Utah, Colorado, Arizona, New Mexico, Texas, Missouri, Iowa, Kansas, Nebraska, North Dakota, South Dakota, Minnesota, Wisconsin, Illinois, Arkansas, Oklahoma, Florida, Alabama, Georgia, South Carolina, North Carolina, Louisiana, Mississippi, Tennessee, Indiana, Kentucky, Michigan, West Virginia, Ohio, Virginia, District of Columbia, Maryland, Delaware, Maine, New Hampshire, Vermont, Massachusetts, Pennsylvania, Rhode Island, Connecticut, New Jersey, New York.

Chas. F. Ash,

REPORT FROM TREASURER

When we started the recent drive for new members we had 5,700 members. On March 1st the total of new members received during January and February amounted to 6,707, making a grand total of 12,407. The new members geographically distributed as follows: Alabama, 58; Alaska, 1; Arizona, 19; Arkansas, 60; California, 461; Colorado, 81; Connecticut, 73; Delaware, 16; District of Columbia, 26; Florida, 46; Georgia, 91; Hawaii, 3; Idaho, 52; Illinois, 497; Indiana, 170; Iowa, 270; Kansas, 177; Kentucky, 117; Louisiana, 76; Maine, 74; Maryland, 74; Massachusetts, 339; Michigan, 217; Minnesota, 213; Mississippi, 59; Missouri, 244; Montana, 46; Nebraska, 127; Nevada, 6; New Hampshire, 43; New Jersey, 137; New Mexico, 15; New York, 675; North Carolina, 69; North Dakota, 51; Ohio, 284; Oklahoma, 157; Oregon, 111; Pennsylvania, 451; Porto Rico, 19; Rhode Island, 35; South Carolina, 46; South Dakota, 36; Tennessee, 212; Texas, 197; Utah, 65; Vermont, 26; Virginia, 72; Washington, 86; West Virginia, 87; Wisconsin, 267; Wyoming, 23.

L. M. WAUGH,
Treasurer.

During February a meeting was called of the fifty dentists assigned to Medical Advisory Boards, in New York City, and an organization was perfected under the name, "The Dental Committee of the New York Medical Advisory Boards." By this meeting a more co-ordinate plan of procedure was perfected. By the time of the next big draft we hope to have dentists on all the Local Exemption Boards. As soon as these men have been appointed a joint meeting of the Medical Board dentists and the Local Board dentists will be called, and the new men will receive the benefit of advice born of experience. It was a satisfaction at the first meeting of the dental committee of the New York Medical Advisory Boards to find that everyone already was a member of the League.

As the Local Exemption Boards will select the majority of the men accepted for active duty, and as these are exactly the men for whom the League desired to work, it is manifest that as quickly as possible we should have dentists on all Exemption Boards throughout the country. This already has been accomplished in several states, and strenuous efforts are being made to have such appointments made in all states. Therefore, to facilitate progress, it would be well for every state director to begin at once making out lists of men who would volunteer for this patriotic duty. It perhaps would be best to ask the presidents of local societies to select these men. Do it now! Then when the government announces that appointments to your Local Boards will be made, and asks for a list of men, you can forward your list by return mail. That would be impressive! That would be efficiency!

R. OTTOLENGUI,
Director of Publicity.

SUGGESTIONS

Conducted by F. R. Chapman, M.S., D.D.S., Columbus, Ohio

(*To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.*)

An Aid in Crown and Bridge Soldering

The Richmond crown and certain parts of bridge work present difficulties in the soldering technic due to the fact that the solder refuses to flow into those V-shaped spaces at the gingival portion over the facing. This may be overcome by clipping up some scrap 22-k. plate, fluxing it and partly filling the space with this scrap. Then continue in the usual manner. These bits of scrap also serve to advantage in preventing the solder from reducing the karat of the cap and backing.

—*F. W. Frahm, Pacific Dental Gazette.*

What is "Trench Mouth."

Since the outbreak of the present war we have heard more or less of various diseases which seem to have automatically taken on popular names, such as "trench feet," "trench fever" and "trench mouth." "Trench mouth" is at its best a crude expression of a pathogenic condition of the mouth. It is impossible to trace its origin to the trenches any more than to the training camps. A suitable and standard name is difficult to find, but I think that the most expressive yet suggested is ulcerative stomatitis.—*V. C. W. Marshall, Capt. C.A.D.C., Oral Health.*

To Make a Painless Insertion of Hypodermic Needle

Select a medium-sized smooth ball burnisher, dip it into carbolic acid and, selecting the place on the gum where you wish to make the puncture, place burnisher on that spot and press firmly for a few seconds, then remove and you will have a slightly concave spot, due to pressure of burnisher, and of whitish color, due to carbolic; insert needle at once and proceed as usual.

—*Cecil Norton, Commonwealth Dental Review.*

To Protect and Remove Rust from Steel Instruments

Dissolve one part of paraffin oil in 200 parts of benzine. Wash the instruments and dry by warming; dip in the solution and lay away in a warm place to dry. Instruments of polished steel, iron, or nickel will remain indefinitely free from rust and corrosion if kept in a two-per-cent. solution of either carbonate, bicarbonate benzoate or barate of sodium.

—*Medical World, Pacific Dental Gazette.*

Points on Use of Amalgam

The washing of amalgams, to a considerable extent, destroys their strength and never should be done. It is practically impossible to entirely remove the substance that is used in the attempt to cleanse this material by the washing process, and fillings made in this way do not have the integrity of the non-washed article. Washing usually consumes enough time to allow the setting process to begin and makes the manipulation much more difficult and in no case improves the integrity of the filling. After my amalgam has been mixed it is not allowed to remain still for a minute. Set amalgam down on your stand and immediately chemical changes that produce setting begin. The mass must be continuously manipulated during the entire process of packing the filling into the cavity. While I am at work upon the amalgam in the cavity, my assistant continues manipulating the balance of the mix, and in this way the actual setting does not begin until the entire filling has been packed into the cavity.

Amalgams worked plastic have well-known adhesive qualities which is not true of amalgams worked dry. If amalgam adheres to the walls of the cavity, there will be no discoloration. If there is a space or defect at the margin, discoloration is more likely to occur.

Every mix should be the same. With correct proportions of mercury and alloy, they will be the same, regardless of the quantity mixed. Excess mercury forced out during the packing process leaves the mass just the same as though it were all squeezed out first. In one case, however, you have a plastic mass that can be adapted to the cavity walls and cavity margins; whereas, in the other case, by squeezing out the mercury first you have a hard mass that cannot be adapted.

—T. P. Hinman, Dental Items of Interest.

Flasking

Dissolve soap in methylated spirits and paint on the invested model before final screwing down of flask; there will be no difficulty of plaster adhering to the vulcanized denture.

J. J. F. McManus, Commonwealth Dental Review.

To Use Cross-cut Inlay Burs

The cross-cut inlay burs so common in use now will cut reverse as well as forward. Learn to use them both ways and save many slips and retain better control of hand piece.—*Victor H. Fuqua, Dental Review.*

Soldering

A minute quantity of gum arabic rubbed up with the borax and water on the slate will prevent the borax from frothing.

—J. J. F. McManus, Commonwealth Dental Review.

Antidote for Carbolic Acid

A common antidote for carbolic acid is alcohol, but common cider vinegar is equally good, and often more handy. Externally, in full strength, it restores the functions of the skin and removes soreness; internally, diluted one-half or two-thirds, it is to be slowly administered in teacup doses.—*Medical Summary, Oral Health.*

Crown and Bridge Investment

A very serviceable investment may be made by mixing plaster of Paris and hard coal ashes. The ashes are prepared by sifting through a fine sieve until all grit is removed and only the fine, soft powder remains. Take one part of the ashes and two parts of the plaster and sift them together very carefully. A small amount of Venetian red may be added to assist in ascertaining whether the mix is uniform. This investment will not warp or crack under the blow-pipe heat, and is superior to many of the patented compounds.—*Pacific Dental Gazette.*

Liquid Flux

A saturated solution of borax in a saturated solution of boric acid makes a very good liquid flux for the laboratory work bench.

R. McClinton, Commonwealth Dental Review.

Service, Not Material

Half of the men who put in gold restorations patch them with amalgam three or four years later and thus save the teeth which they were not skilled enough to save with gold. The fact remains that any operation, whether with amalgam or gold, is worthy of all the care you can put into it; and the day has gone by when an amalgam filling is paid for because it is an amalgam filling, and a gold filling because it is a gold filling. It is the object you have in mind when you do the operation for which you should render your bill.

—F. T. VanWoert, Dental Items of Interest.

Repairing a Puncture in the Rubber Dam After Adjustment

Take a piece of surgeon's adhesive plaster of proper size, warm it slightly and cover the puncture. It will very effectually seal the opening.—*Dental Review.*

To Keep the Hands Clean

For those who do their own mechanical work, rubber gloves will be found very useful in keeping the hands clean. All that is necessary is to dry them thoroughly after using, and sprinkle with French chalk. Always sprinkle a little chalk on the hands before putting them on.

—W. A. Love, Commonwealth Dental Review.

OBITUARY

DR. E. V. BURT

DR. E. V. BURT, of Lafayette, Ind., died on Monday, March 11, 1918. Dr. Burt was born in Lafayette, April 6, 1840, and had he lived until the 6th of next April he would have been 78 years old. He worked at his practice until the last few weeks, and on the first of February he achieved the distinction of having been engaged in dental practice for sixty years, during all of which time he was in the same office rooms. It is probable that while other dentists have served as long or longer in the profession than did Dr. Burt, that he was the only one on record who was located in the same office rooms for the entire time.

On the first of February, the anniversary of his sixtieth year in practice, the West-Central Dental Society, of which he was president, sent him sixty carnations. In addition he received flowers from Mrs. W. M. Herriott & Son, and also from different business associates of his in Lafayette. Telegrams and letters of congratulations came to him from all parts of the state and a few from beyond the borders of the state.

At a meeting of the Lafayette Dental Society on Tuesday evening, March 12th, the following testimonial was adopted by all of the Lafayette dentists:

In the death of Dr. E. V. Burt, of Lafayette, which occurred on March 11, 1918, the dental profession of Indiana loses a distinguished member. He was dean of the Life Members of the Indiana State Association, having joined that organization in 1864; at the time of his death he was the president of the West-Central Dental Society, a district society embracing eight counties.

Dr. Burt achieved the rare distinction of being actively identified with the dental profession for sixty years. Throughout his professional career he maintained high ethical standards, a lofty devotion to professional ideals and a quiet but firm insistance that dentistry was more than a business and was entitled to rank as a life work.

The dentists of Lafayette, to whom Dr. Burt was a constant inspiration and a never-failing friend, feel that in his death they have suffered an irreparable loss. Their sympathy is extended to Mrs. Burt and the other members of Dr. Burt's immediate family; and they join with them in their time of sorrow in appreciation of their great loss.

THE LAFAYETTE DENTAL SOCIETY,
DR. C. G. ROSS, *Pres.*,
DR. L. M. CHILDERS, *Secy.*

Dr. John W. Parsons

Dr. John W. Parsons, of Huntington, W. Va., died February 28, 1918, after a week's illness following an operation for appendicitis, aged 44 years. This announcement will come as a shock to his many warm professional friends, not only in the West Virginia Dental Society, of which he was secretary at the time of his death, but in many adjoining states where he was a frequent visitor at dental meetings.

Dr. Parsons was a gentleman of endearing personality, of high ideals and one whose precepts meant scientific as well as skillful dentistry. He began his education at Oberlin, Ohio, and received his dental degree at the Dental Department University of Pennsylvania, 1898. He located in Cleveland where he practiced six years, when he removed to Huntington, where he continued practice until his death. Two years ago he graduated at the Dewey School of Orthodontia, since which time he has been practicing that specialty exclusively. He was one of the organizers and first presidents of the Huntington Dental Society, an active member of the West Virginia society, for several years secretary, and was prominent in the upbuilding of the society and placing the profession on a high plane of excellence. His papers and clinics before the society showed originality and skill, and John W. Parson's influence will survive him.

His widow, formerly Miss Catherine Yarwood, of Elgin, Ill., and his children, Jeanette, Warren and John, and his parents, Mr. and Mrs. Warren J. Parsons, survive him. His fraternal affiliation was the Elks, and he was a member of the First Congregational Church. At his burial in Spring Hill Cemetery, Huntington, the local dentists acted as pallbearers, and the officers of the state society as honorary bearers. Many members of the profession from the state paid homage to his memory by their attendance.

"But since he had the genius to be loved,
Let him have the justice to be honored in his grave."

—E. C. M.

SOCIETY·ANNOUNCEMENTS

Northern Ohio

The annual meeting of The Northern Ohio Dental Association will be held at Toledo June 6th, 7th and 8th. Program will be announced later.

Columbus Dental Society Meeting

The Columbus Dental Society has completed an interesting and instructive program for its annual meeting, Saturday, April 27th, at the Southern Hotel. The meeting will be called at 10:00 A.M. by Dr. J. M. Henderson, president of the society, After routine business the morning will be spent with a number of exhibitors who will be present with some interesting demonstrations. The following essayists are on the program: Dr. L. E. Custer, Dayton, will read a paper relative to Root-Canal Technic, with clinic; Dr. E. Ballard Lodge, of Cleveland, now located at Camp Sherman, Chillicothe, paper on Injuries of the Maxilla and Their Treatment, illustrated; Dr. Alden Bush, Columbus, Bridgework; Dr. Hugh MacMillan, Cincinnati, will give an illustrated lecture on Oral Surgery, with reference to areas and necrotic conditions about the apices of roots.

These men need no introduction and they will have a message of value for you; in addition there will be a dozen clinics of practical value. You cannot afford to miss this meeting, as it is due your clientele that you attend all sessions. Mark off the date now, as the Columbus men will give you a cordial welcome. Come.

E. C. MILLS, *Chairman*,
HARRY COPE,
D. P. SNYDER,
Committee.

Indiana State Board

Next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, June 17-22, inclusive. Applications and other information may be obtained by addressing H. C. McKittrick, Secretary, Indianapolis, Ind.

Illinois State

The fifty-fourth annual meeting of the Illinois State Dental Society will be held at Bloomington, Ill., May 14-15-16-17, 1918.

J. P. LUTHRINGER, *Secy.*

Michigan State

The sixty-second annual meeting of the Michigan State Dental Society will be held at the Hotel Statler, Detroit, week of April 8-13, 1918. The regular meeting will be held on April 8th and 9th, with a splendid program. The remainder of the week will be a post-graduate meeting in charge of the Detroit Club Clinic, at which every important branch of dentistry will be covered. C. G. BATES, *Secy.*,
Durand, Mich.

Michigan State Board

The next meeting of the Michigan State Board of Dental Examiners will be held at the dental college, University of Michigan, Ann Arbor, Mich., June 17 to 22, inclusive. Applications and other information may be obtained by addressing B. S. SUTHERLAND, *Secy.*,
Owosso, Mich.

Kentucky State Dental Association

The next annual meeting of the Kentucky State Dental Association will be held at Lexington, Ky., June 13-14-15, 1918. An "amalgam program of special interest." Address all correspondence to Dr. W. M. Randall, Secy., Louisville, Ky.

Iowa State

The fifty-sixth annual meeting of the Iowa State Dental Society will be held in Des Moines, Ia., May 7-8-9, 1918. An excellent program has been prepared, including seminars, papers and clinics. A cordial invitation is extended ethical members of the profession from out of state to attend any or all of these sessions.

E. R. SWANK, *Secy.*,
Panora, Ia.

Lake Erie Dental Association

The next annual meeting of the Lake Erie Dental Association will be held in Cambridge Springs, at the Hotel Bartlett, May 23, 24 25, 1918. We have some good essayists in view and will be able to report the program within three or four weeks.

DR. CLINTON L. MCCHESNEY, *Sec.*,
616 Warrington Ave., Pittsburgh, Pa.

West Virginia State Board

The annual examination of candidates for license to practice in the state of West Virginia will be held at Parkersburg, W. Va., June 25, 26 and 27, 1918. Blanks and information will be furnished on application to the undersigned.

H. H. SMALLRIDGE, *Secretary.*

Pennsylvania State Board

The next examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Wednesday, Thursday, Friday and Saturday, June 12, 13, 14 and 15, 1918.

The examination in Practical Work will be in the Evans Dental Institute, 40th and Spruce streets, Philadelphia, and the University of Pittsburgh, Pittsburgh, on Wendesday, June 12th. The examination in operative work will be held at 8:30 A.M., and the Prosthetic Work at 1:30 P.M. Applicants are required to furnish all instruments and a patient for the operative work. The theoretical examination will be held in Musical Fund Hall, Philadelphia, and College of Pharmacy, Pride and Bluff streets, Pittsburgh, beginning at 9:00 A.M. on Thursday, June 13th.

Application papers can be secured from the Department of Public Instruction, Harrisburg. ALEXANDER H. REYNOLDS, *Sec.*,
4630 Chester Ave., Philadelphia.

Tennessee State Dental Association

The fifty-first annual meeting of the Tennessee State Dental Association will be held in Nashville, Tenn., June 17, 18 and 19, 1918.

GEO L. POWERS, *Sec.*,
Paris, Tenn.

North Carolina Society

The forty-fourth annual meeting of the North Carolina Dental Society will be held in Wilmington, N. C., June 19-21, 1918. Headquarters, Oceanic Hotel. W. T. MARTIN, *Secy.*

South Carolina State Board

The annual meeting of the Board of Dental Examiners in the state of South Carolina will be held at The Jefferson, Columbia, S. C., beginning promptly at 9:00 o'clock, Monday morning, June 24th, 1918. All applications must be in the hands of the secretary by June 14th. Application blanks and full information may be obtained by addressing

R. L. SPENCER, *Secretary*,
Bennettsville, S. C.

Florida State

The Florida State Dental Society will hold its next annual meeting at the Atlantic Beach Hotel, Atlantic Beach, Fla., on June 20, 21, 22, where fishing, golfing and surf-bathing are unsurpassed. A fine program is being planned. All ethical practitioners of this and other states invited to attend. For further particulars address D. D. Crews, D.D.S., secretary, Fort Myers, Florida.

Georgia State

The semi-annual meeting of the Georgia State Dental Society will be held in Atlanta, Ga., June 12, 13 and 14. This society will celebrate its fiftieth anniversary.

North Dakota State Dental Association

The North Dakota State Dental Association will hold their annual meeting at Grand Forks, North Dakota, May 21, 22, 1918.

ALBERT HALLENBERG, *Pres.*,
SOLON CRUM, *Sec.*,
Fargo, N. Dak.

National Association of Dental Faculties

The next annual meeting of the National Association of Dental Faculties will be held in the Green Room of the Congress Hotel, Chicago, Ill., August 2d, at noon. The executive committee will meet at 10:00 A.M. on the second. The meeting will continue through August 3rd.

CHARLES CHANNING ALLEN, *Sec.*,
N.W. corner 10th and Troost, Kansas City, Mo.
Care K. C. Dental Col.

Notice

The eighteenth annual meeting of the American Society of Orthodontists will be held August 1, 2 and 3, at the Edgewater Beach Hotel, Chicago, Ill. This will be an excellent meeting. It is advisable to make your reservations early.

Dentists' Mutual Protective Alliance Wins Its Suit

EDITOR DENTAL SUMMARY:

I am glad to inform you that the case of the Alliance against Taggart which has been in the courts here in Chicago for the last four years, has been won by the Alliance on all points, the decision having been handed down about three days ago. The decision is rather lengthy and it is not possible for us to give you a detailed extract of it just now, but we shall mail you one ready to go into your May issue.

Very truly yours,
March 13, 1918. M. D. K. BREMNER, *President.*

Dentistry in the Bible and Talmud. A valuable contribution to the early History of Dentistry, by Dr. Samuel Greif, author of "Who's Who in Dentistry." New York; Who's Who Publishing Co., 1918.

The author presents this treatise as an interesting and complete account of dentistry in the Bible and Talmud. He quotes the passages in the Bible and Talmud where the word "tooth" is mentioned. The author has given many explanatory notes about the quotations especially from the Talmud. It is an unique and interesting presentation.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

ANNOUNCEMENT

Beginning July 1, 1918, the subscription price of THE DENTAL SUMMARY will be increased as follows:

United States and Possessions	$1.50
Canada	1.90
Foreign, U. P. U. Countries	2.25

This increase is made positively necessary by the rise in the price of paper and cost of production generally, and will remain in force only so long as war conditions prevail. Subscriptions received prior to the date named will be accepted at the old rate.

LACONIGRAMS

The Annual Clinic Day of the Toledo Dental Society, March 8, was devoted entirely to the consideration of the Hall Method of Impression Taking, demonstrated by Dr. M. M. House, of Indianapolis. Three sessions, morning, afternoon and evening, were held, diversified most enjoyably by a dinner at 6:30, served in the new Lasalle & Koch dining room. Places were reserved for more than eighty guests, local and from out of town; and it has been many a day since such an affair passed off so pleasantly. Splendid music was supplied. Under the leadership of Dr. L. T. Canfield, several patriotic songs were sung in chorus, adding greatly to the spirit of fellowship that pervaded the entire event.

It really isn't necessary to visit the country of our European enemy to find the Teuton type of mind—one that resents in others precisely those things and acts by which its own peculiarities are made manifest. Glass houses do not make good artillery bases.

Dr. Arthur N. Davis, of Piqua, Ohio, who has been the kaiser's private dentist for the past fourteen years, returned to this country February 19, bringing with him news that the enemy does not take our entry into the war at all seriously, officers reporting that most of the transports carrying American troops have been sunk by U-boats, not more than 30,000 having landed. Germany expects to fight the war to a draw within six months. Otherwise, she will go on fighting as long as possible. Dr. Davis says that the real reason why Germany went into the war was to prevent the socialists gaining the upper hand.

Dentists state that it is very evident that some of the mouths of the registrants never made the acquaintance of the tooth brush. For such as these the war is sure to prove a boon.

Conscripts who can pay for dentistry should be compelled to do so. Dentists are as patriotic as any other set of men, but too much is quite a plenty. There is no reason why men whose incomes are considerably larger than that of the dentist who does their work should expect charity, even in the guise of patriotism.

And now go right down to the corner drug store and buy that Saving Stamp.

The Research Club of Cincinnati has taken action toward the establishment of a permanent memorial to Dr. John R. Callahan.

The College of Dentistry, Iowa State University, flies a service flag bearing sixty-four stars.

Tooth-brush drill and other sanitary precautions are being urged upon the management of large industrial plants. It most certainly is needed.

If you have any quantity of platinum and gold scrap, old platinum-pin teeth, etc., get it together and send it to your dealer *Now*. There never was a time when it was worth so much, and the time never may come again.

Los Angeles is looking for a school dentist. All the younger men are in the army and the older ones are in business for themselves. Might be an opportunity for some young dentist who has failed to pass for the Reserve Corps.

There are now eleven dental ambulances in France. The new allotment is expected to provide a dentist for each 500 men.

Every loyal American must constitute himself a board of investigation concerning the loyalty of hyphenates in his neighborhood. Underhand work of the most contemptible variety is going on constantly, and it is "up to us" to see that nothing is left undone to prevent it that we can do.

REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

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ANTRUM SURGERY*

BY S. MARSHALL WEAVER, D.D.S., CLEVELAND, OHIO

S. MARSHALL WEAVER

IN ORDER that we may be thoroughly refreshed on the structures under discussion, I will take the liberty of reviewing in detail the immediate anatomy. The maxillary sinus or antrum of Highmore is the largest pneumatic space communicating with the nasal fossa, and is situated in the body of the maxillary bone.

In the typical specimen the cavity is somewhat pyramidal in shape, with its base toward the nasal fossa, and its apex extending toward and sometimes in the malar bone. Aside from this typical shape the maxillary sinus varies very much in form and size in different individuals and on the two sides in the same individual. The cavity is lined with muco-periosteum surmounted by a layer of ciliated columnar epithelium. The floor of the maxillary sinus is composed of the alveolar process. It presents conic elevations corresponding to the apices of the roots of the molar and sometimes of the bicuspids. It also may represent partial septa extending transversely. According to Ivey, "complete septæ never are found in the maxillary sinus." The roof of the maxillary sinus is formed by the orbital plate of the maxillary bone, which separates it from the orbit. It represents a ridge of bone inclosing the canal for the passage of the infra-orbital vessels and nerves. The anterior wall is formed by the facial portion of the maxilla, containing the anterior dental canal, transmitting nerves and vessels to the incisor teeth. The posterior wall by the zygomatic plate. The nasal wall is formed chiefly by the maxilla, aided by the inferior turbinated, ethmoid and palate bones. This partition separates the maxillary sinus from the nasal fossa. At the upper anterior portion of this wall is found the ostium maxillary, an oval foramen, which affords communication between the maxillary sinus and the middle meatus, opening directly into the hiatus semilunaris, and affords the only opening of the antrum of Highmore.

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*Read before the mid-winter meeting of the Rehwinkel Dental Society and the Eighty-Third Division Dental Society, U. S., N. A., at Camp Sherman, Ohio, Feb. 1918.

Under normal conditions there is communication between the maxillary sinus and the frontal sinus through the ostium maxillary, the hiatus semilunar and the ostium frontal. By this communication disease from the teeth may be spread through the antrum to the frontal sinus and pneumatic spaces.

The maxillary sinus may be the seat of catarrhal inflammation, empyema or suppurative inflammation, impacted teeth, tumors and polypus. Catarrhal inflammation usually is the result of extension of catarrh from the nose and associated air cells. The inflammation extends from the middle meatus of the nose by way of the hiatus semilunar and ostium maxillary. The mucous membrane becomes swollen and secretes mucus. This blocks up the ostium maxillary, and when the antrum is filled the pressure gives rise to pain. This may be termed simple acute catarrhal inflammation, and is not necessarily operative, but may be treated with nasal sprays. A two per cent. solution of cocain in 1-1000 adrenalin chlorid applied on a probe wrapped with cotton will give almost immediate relief, and will allow the antrum to empty by constricting the tissue surrounding the ostium maxillary.

Supposing the right side is affected, instruct the patient to lie crosswise of a bed with head hanging down over the edge, with the affected side up. With the finger close the left or lower nostril, instructing the patient to blow gently, causing the air to pass by the ostium maxillary, or opening, or antrum. The action works similar to a saliva ejector and sucks the secretions out of the antrum. This can be repeated every hour or so and gives great relief. A teaspoonful of gum camphor put in boiling water and placed so the steam is inhaled will be found very soothing, when the patient cannot reach a physician or dentist. Two rhinitis tablets full strength, and ten grains aspirin taken alternately every two hours always should be administered. This treatment arrests the secretion and relieves the pain.

Suppurative inflammation, or empyema, may be caused from infection extending from the nose and associated air cells, or from penetration through the floor of the antrum, of bacteria and their products, arising from infected teeth, although nature stops a great many of the latter infections by hyperplasia. Robert H. Ivey makes a statement that "a great many more teeth are lost through diseases of the antrum than cases in which the teeth primarily are diseased and cause infection of the antrum." Symptoms of acute empyema are pain, swelling and tenderness over the affected side of the face. Pus may flow from the nostril when the head is held forward and downward with the affected side up. A sweetish taste invariably is present in the morning.

An enlarged turbinate or deflected septum often is the seat of trouble. This becomes inflamed from the effect of a cold and blocks up the ostium maxillary; if this keeps recurring it is best to snip the end of the turbinate off, making an unobstructed passage.

Infection is carried into the antrum many times by hard blowing of the nose. Pinching the nose too tightly when blowing is dangerous both to the ears and the antrum.

If infection comes from the tooth, the radiogram will aid materially in diagnosis. The tooth should be treated before the antrum is operated on, in order to eliminate the source of infection. This special treatment consists in applying rubber dam, cleansing the tooth thoroughly with agents best suited for the case, and finally filling the canals full of bismuth paste, forcing the paste through into the antrum. The permanent root filling may be put in later.

Chronic suppuration usually is accompanied by very little pain and little or no swelling. The flow of pus is about the only symptom recognizable by the patient. This may be from the nose or a fistula in the mouth. The dentist should be able to recognize a difference in the appearance of the opposite sides of the face, the eye on the affected side will have a different look, hard to explain unless we say a dulled expression. To determine which antrum is affected in cases where there is a question, hold the patient's cheeks between the palms of your hands, allowing the thumbs to press gently downward and backward over both infra-orbital foramen with equal pressure. The patient will flinch away from the affected side. Trans-illumination is employed, but not reliable. If there is a question as to whether the antrum contains pus, the only positive diagnosis is to puncture the antrum with a hollow trocar through the nasal wall, and wash it out with clear sterile water. If pus is present it can be seen easily in the washing, and usually manifests itself in small floccular particles or large clots of white or yellow pus, generally the latter, and invariably is accompanied by a strong odor.

Infiltrated tissue often will show up as cloudy in the full cranial radiogram, giving the operator the impression that pus is present when it is not. As the puncture can be made in ten minutes without pain, and with positive results, why submit the patient to this extra $10 or $15 expense for an uncertainty? The puncture can be made under a local anesthetic or gas. There is no after-pain or soreness. This treatment can be repeated if necessary several times, but quite often one washing will take care of the acute cases.

Surgical treatment consists in making an opening into the maxillary sinus for drainage, observation and curettment; this may be done in the following ways:

First: Through the socket of an extracted tooth.
Second: (Radical) through the nose.
Third: Through the canine fossa.
Fourth: Through the alveolar process just above the second bicuspid tooth.

I wish to advise against the first and most common method, that of opening through the tooth socket. It absolutely is useless to sacrifice a good tooth and even one that may have caused infection, for the opening may be made over the affected tooth, the affected area properly curetted and all taken care of in the one operation, aside from sacrificing the tooth, the socket may not be and usually is not the most dependent portion of the floor. Also, if septi are present the drainage is imperfect and removal of the septum is practically impossible from this kind of opening. Owing to the thickness of the alveolus and lack of soft tissue, these openings are not easily closed up.

The second, or radical, through the nose, has several drawbacks. First, it is necessarily the most mutilating of all. The operation consists of the removal of the anterior portion of the inferior turbinate, and breaking down of the entire nasal wall of the antrum. All packing has to be inserted through the nose. After recovery the patient is quite often annoyed by having large quantities of mucus run unceremoniously out of the nose if the head is tipped forward, caused by the floor of the antrum being lower than the nose, thus forming a receptacle. It also affects the resonance of the voice to a certain extent. In cold weather the patient may complain of extreme sensitiveness and neuralgic pains due to the lack of the protecting nasal wall. It also allows dust and mucus to enter the antrum, thus becoming a constant irritant and making the permanent cure of the disease impossible. Nasal mucus will enter these large openings, become encrusted, and cannot be removed except with great difficulty.

The third and fourth are nearly similar in position and ease of operation, though I prefer the latter position principally because the bone is thinner at this location. The idea of being at the most dependent point is not so important, where the opening is made large enough for proper curetting and packing.

My technic for opening the maxillary sinus is as follows: The patient should be placed under gas or novocain; if novocain, use the conductive method. With a sharp lancet make an incision one and one-half inches long across the field of operation, parallel with the occlusal plane, or you may curve the center of the line down one-half inch, making a flap to be lifted up while operating. Push up the tissue from the bone with an osteotome. This is to prevent the tissue from winding up on the bone bur. Hold the flap back with retractors, and with a bone bur puncture the wall; then use a large bone bur similar to a dentate fissure, and enlarge the opening to about three-quarters of an inch laterally and one-half or three-quarters of an inch vertically, as the case may require. Extend the opening laterally and downward rather than upward, to avoid injury to the infra-orbital vessels and nerves. After the opening is completed and large enough for good vision, and to admit the index finger, insert a safe-edged loop curette and thoroughly explore every portion of the antrum for polypi. This curette will pass over the mucous membrane without injury, and at the same time remove any projecting growth. If infection was caused by an abscessed tooth, the region around the root of the affected tooth should be thoroughly curetted with a spoon curette, removing all necrotic bone. Quite often the antrum is found packed full of polypi. These polypi are pedunculated growths covered with mucous membrane. They are an over-growth of the submucous tissue, and contain cystic areas filled with mucus. They follow chronic inflammatory conditions.

We also find the fibrous polypi springing from the periosteum. They are felt as soft and semi-solid masses, bleeding easily on touch. After curetting thoroughly, wash out with normal saline solution, removing all loose pieces of tissue. Dry out the antrum with gauze sponges, then swab with cotton saturated with glycerol iodid, and pack *full* with iodoform or borated gauze, changing this every day for about ten days, and thoroughly irrigating with the normal saline at about 105 degrees. After the tenth day simply pack the opening with gauze sufficient to retain the required size for the insertion of the nozzle of the irrigating tube. After about ten days more the packing may be dispensed with, for the wound will remain open for a considerable time. At this stage you may mold a modeling compound plug to fit the opening. This can be replaced after each treatment. The patient may be given a soft-nosed bulb syringe and instructed how to irrigate at least twice daily. Thorough irrigating with a saline solution is better than strong irritating drugs. Keep any wound clean and nature will do a great deal.

If the case does not clear up in a reasonable length of time and seems to be reinfected, the frontal sinus may be the seat of infection. Here the full carnial radiogram will be of considerable help, and if found necessary to operate, I believe the general surgeon or rhinologist is the best fitted for this work.

Dr. M. H. Cryer first pointed out that direct communication frequently was found between the frontal sinus and the antrum, and Schaeffer claims that fifty-six per cent. of all cases examined show this.

Drainage tubes never are indicated. They are liable to become lost in the antrum and cause future trouble. Dr. Cryer states that seventy-five per cent. of cases under his observation come from dental causes.

Mikulitz operation, which calls for the removal of a portion of the nasal wall, including a part or all of the inferior turbinated bone in order to make a large permanent opening, is rightfully being abandoned in the light of better methods. Every surgical operation should be made with the view of leaving the parts in as nearly a *normal anatomical* condition as possible. Consequently, the enlarged openings through the nose are absolutely contra-indicated in view of all the *permanent injuries* that may ensue, when more conservative methods will cure the disease and preserve the integrity of the tissue.

I am aware that many operate through the nose, where a good vision of the interior of the antrum is difficult if not impossible, where infection is just as liable to occur as through the mouth, and where access to all surfaces of the antrum is much more difficult. I want to ask why make the operation harder, why not open at the most accessible point and the best visual aspect, when all abnormalities can be recognized and taken care of with the greatest ease and assurance of their complete removal?

I will now show a few cases in practice, and instruments used in handling the cases.

Fig. 1 shows proper place to open most antrums. *Fig. 2.* Heavy lancets and osteotome for making incision and removing tissue from bone. *Fig. 3.* Surgical burs used for removing bone. *Fig 4.* Loop curette which does not cut on the edge, but will cut off any growth projecting from the surface. *Fig. 5.* Different styles of bone curettes used to remove necrotic areas. *Fig. 6.* Six-ounce all-metal syringe that can be sterilized; also showing different sized points.

Fig. 7. Soft-nosed bulb syringe, used for home irrigating. *Fig. 8.* Nose speculum, a very important instrument in diagnosis. *Fig. 9.* Hollow trocars used to puncture nasal wall of antrum for exploratory puncture.

Fig. 10. Please notice in this skull that the roots of all the molars penetrate the floor of the antrum and also a beautiful septum extending across the antrum directly over the second bicuspid and about three-fourths inch high, separating the antrum into two distinct chambers, with the cuspid and two bicuspid roots in the anterior chamber. This demonstrates why drainage tubes are not indicated and also why we should enter the antrum where the partitions can be broken down easily.

Fig. 11. Radiogram taken of Plate 10, to demonstrate how the septum would show where we know the exact conditions. *Fig. 12* shows remarkable dip of the antrum floor. *Fig. 13* shows another septum and an irregular floor. *Fig. 14* shows the necrotic area around the cuspid root. This penetrated the antrum and caused severe trouble. The radiogram was taken after the root canal was filled and antrum curetted. Later we found every tooth on this side putrescent and penetrating the antrum floor.

Fig. 15. This patient suffered with severe neuralgia in the mastoid region and in the top of the head, both entirely relieved after the operation.

Fig. 16 shows antral infection from the putrescent second bicuspid. A broach passed freely into the antrum, but there seemed to be little if any destruction of bone. This case cleared up with a very few treatments.

Fig. 17 shows what nature will attempt to do by phyerplasia. Notice how the floor has been pushed up in an attempt to confine the affected area. This patient was seriously ill, and had been treated for liver trouble for nine months. Finally she detected a slight swelling over the first bicuspid root and came to me for treatment. The radiogram disclosed an abscess over the second bicuspid; in attempting to curette out the necrotic tissue we found it communicated with the

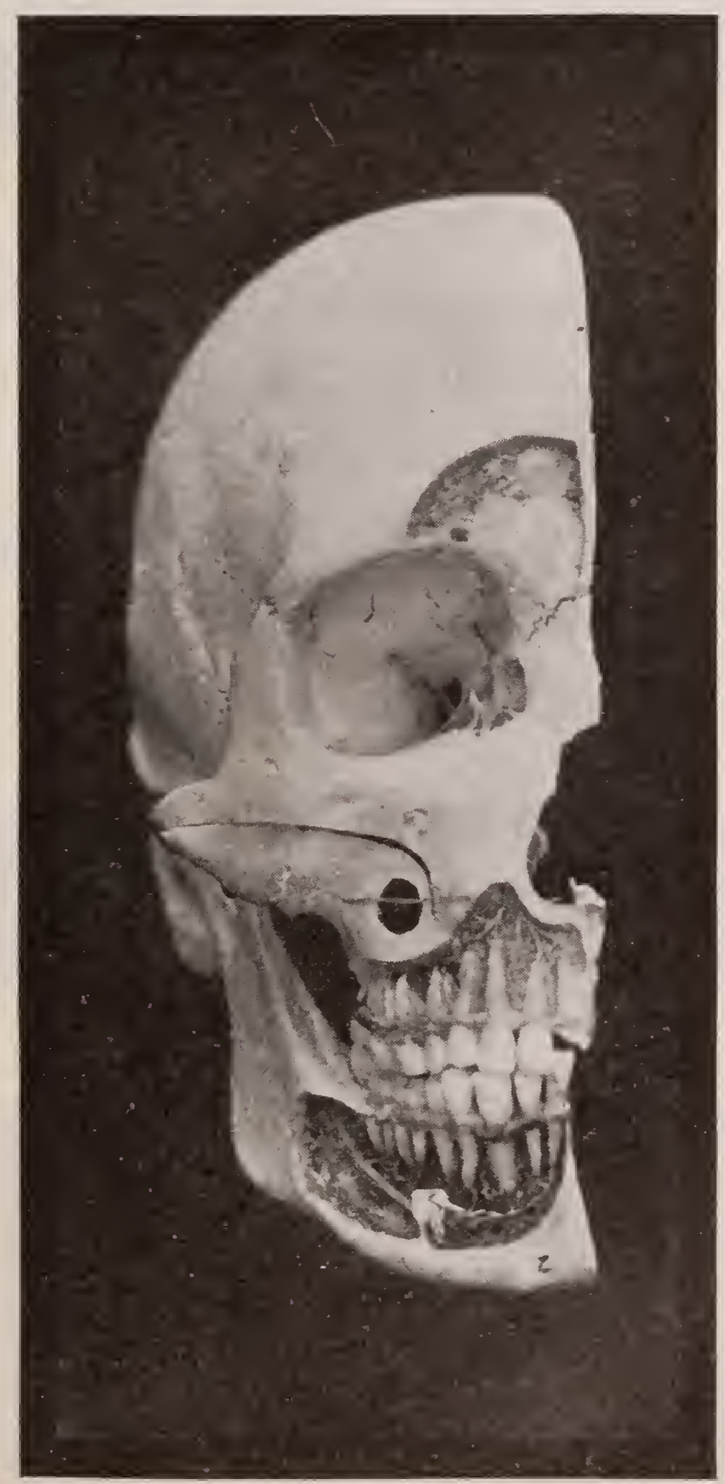

Fig. 1

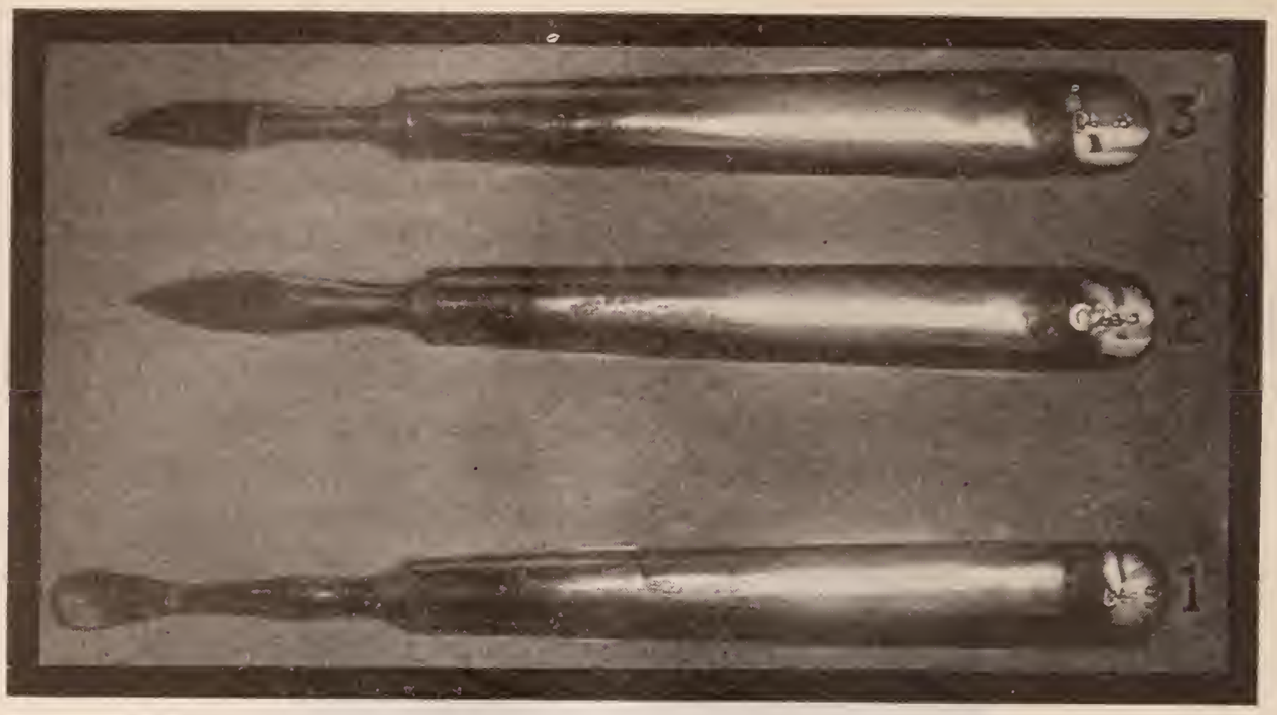

Fig. 2

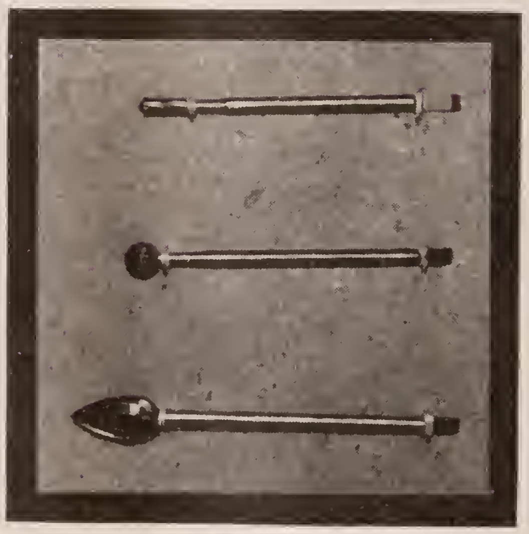

Fig. 3

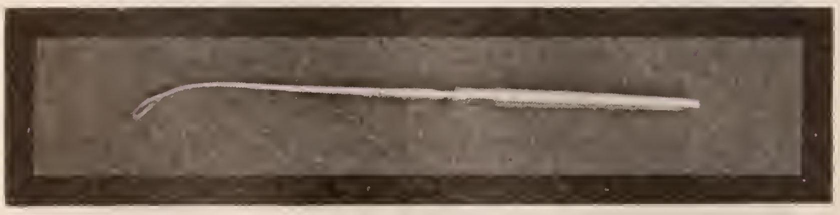

Fig: 4

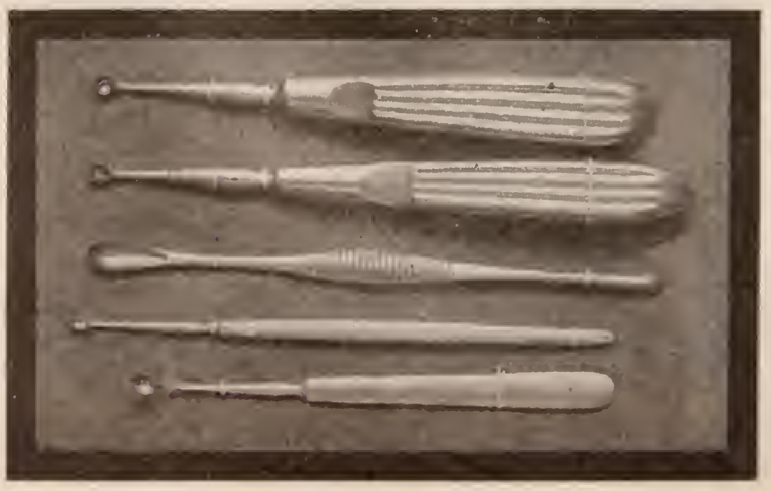

Fig. 5

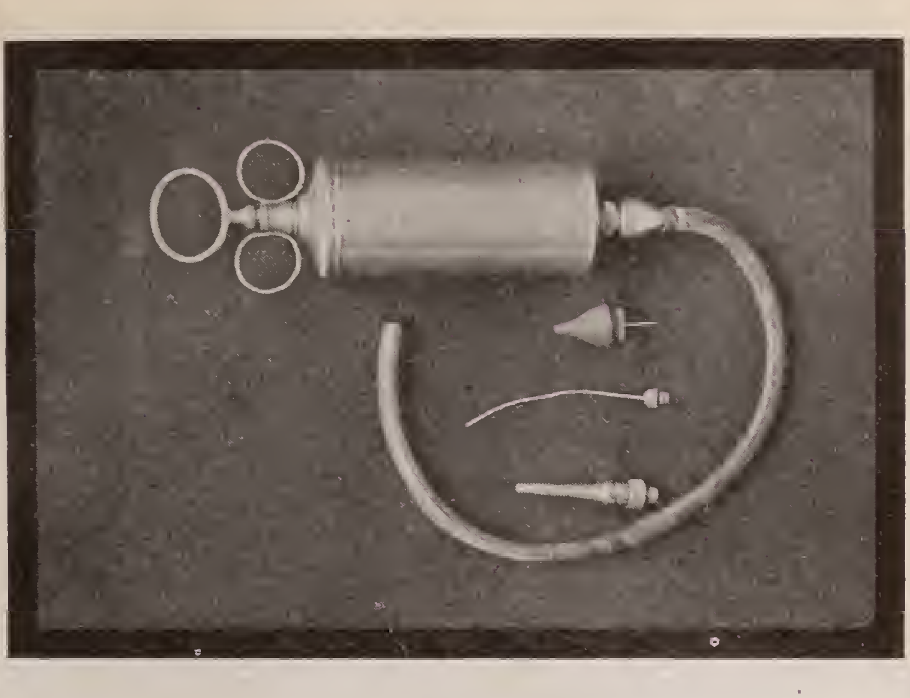

Fig. 6

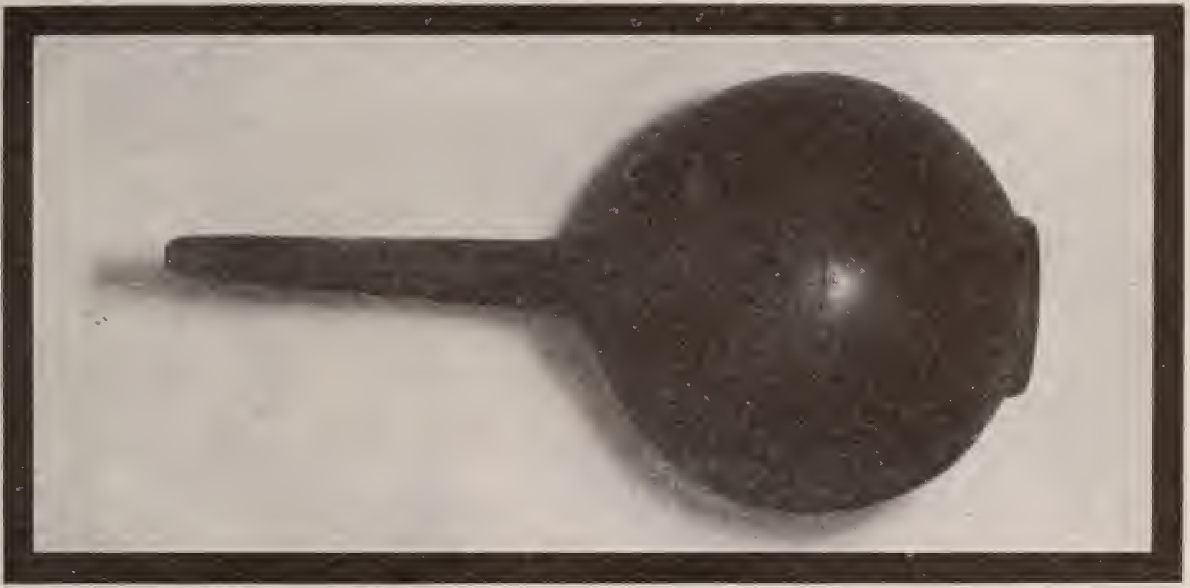

Fig. 7

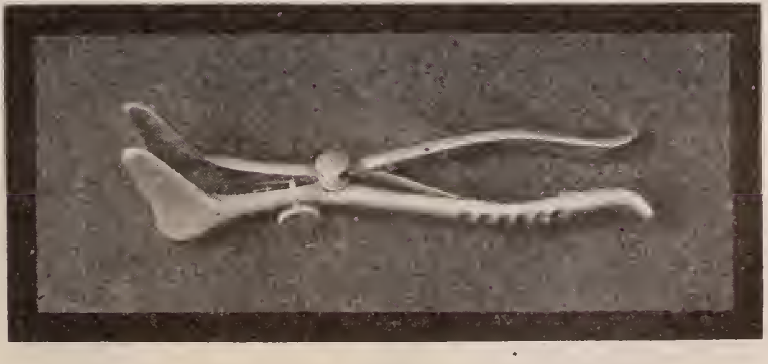

Fig. 8

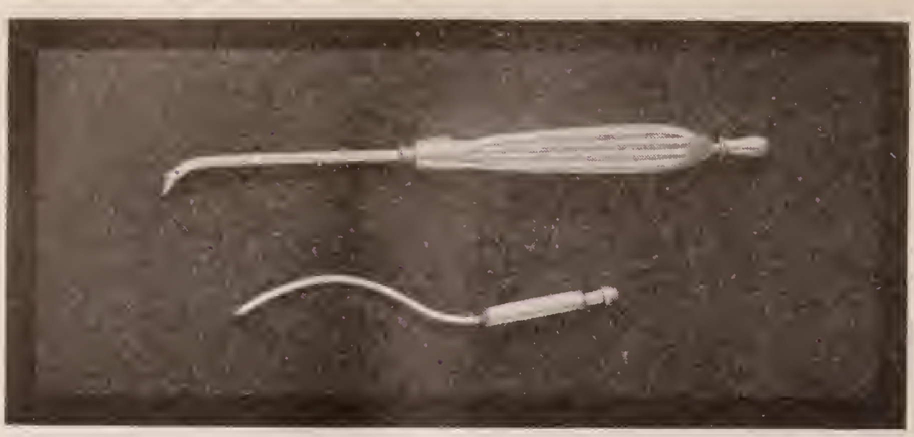

Fig. 9

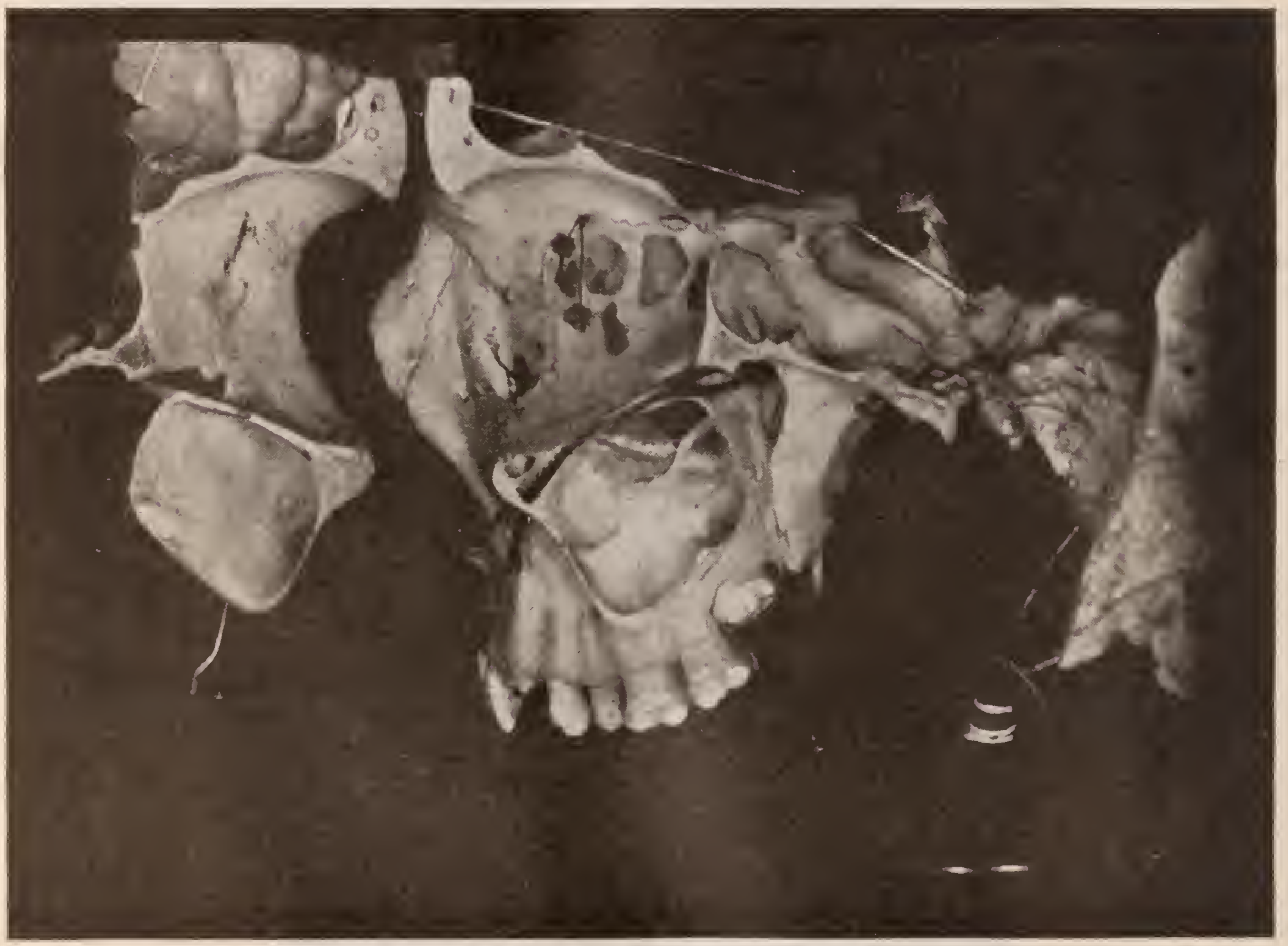

Fig. 10

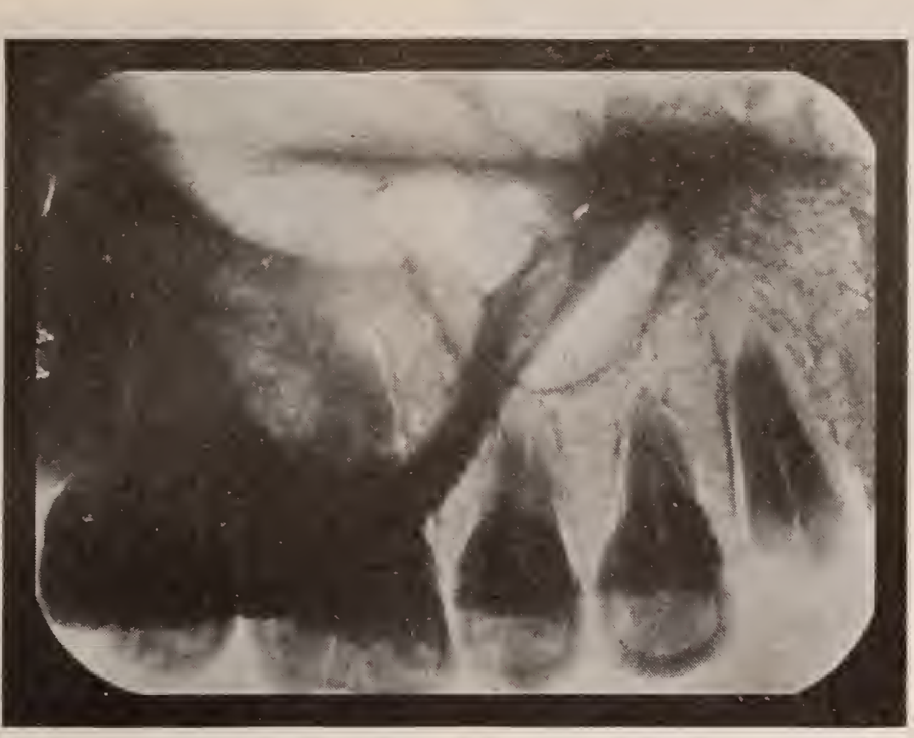

Fig. 11

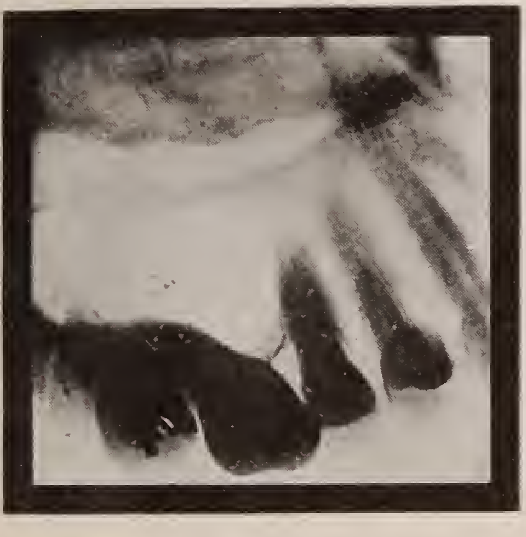

Fig. 12

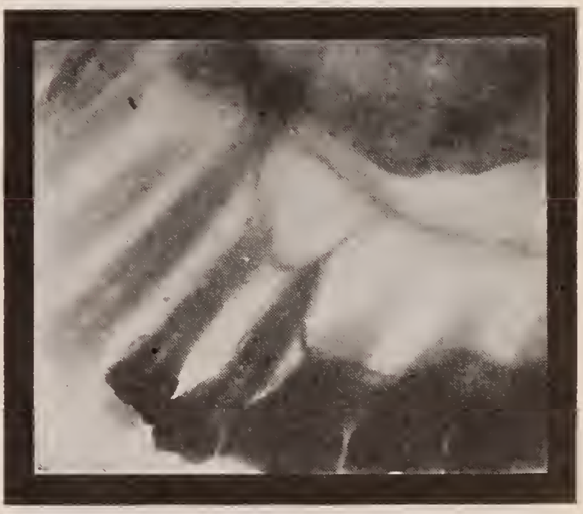

Fig. 13

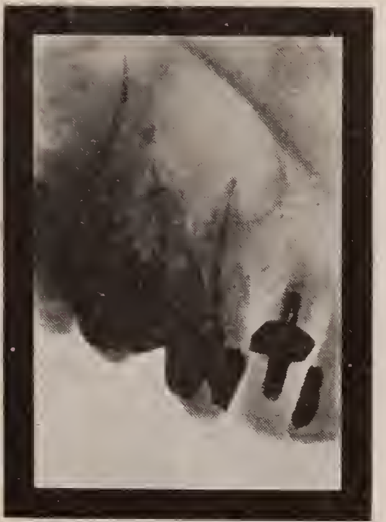

Fig. 14

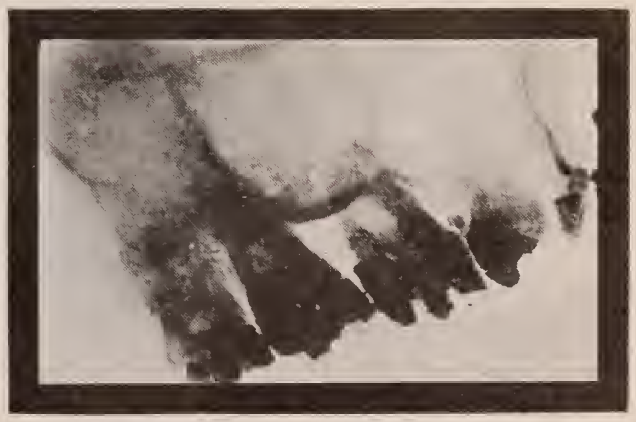

Fig. 15

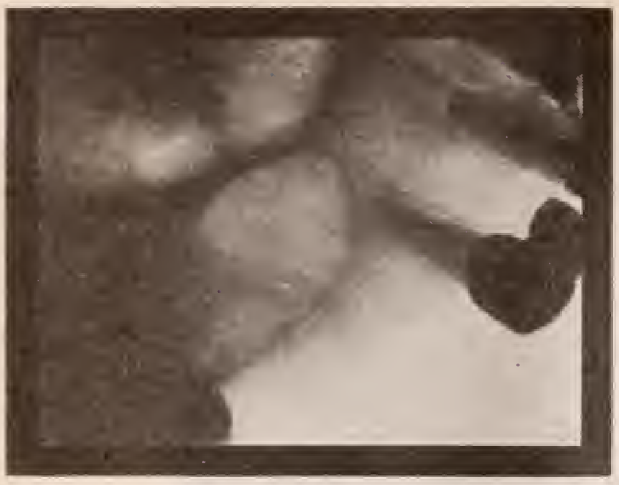

Fig. 16

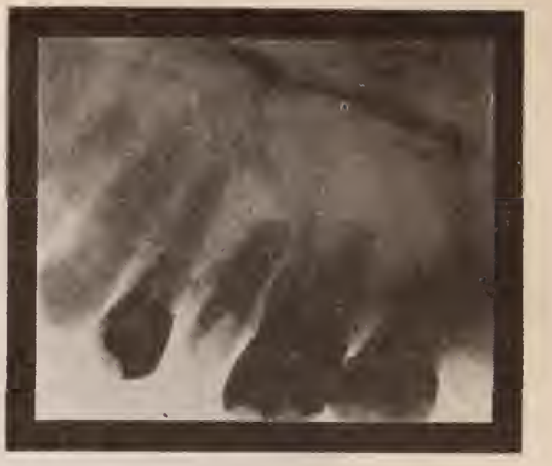

Fig. 17

antrum, which was filled with pus. Thorough curetting of the surrounding tissue and irrigation for a couple of weeks brought about her complete recovery.

Fig. 18 shows infection from the cuspid, this case being of long standing. The antrum was packed solid with polypi and necessitated treatment for about twelve weeks before we had complete recovery.

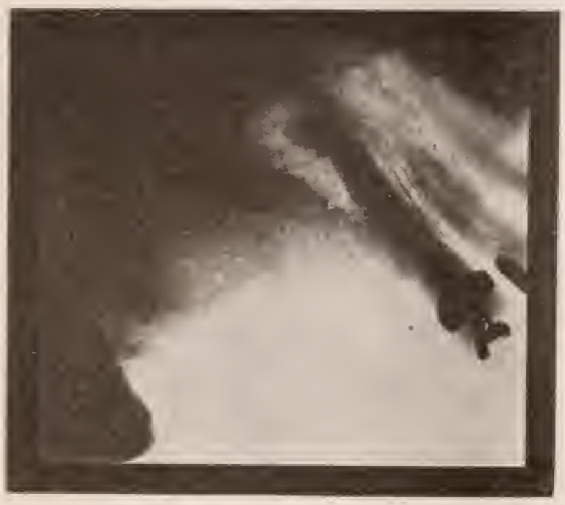

Fig. 18

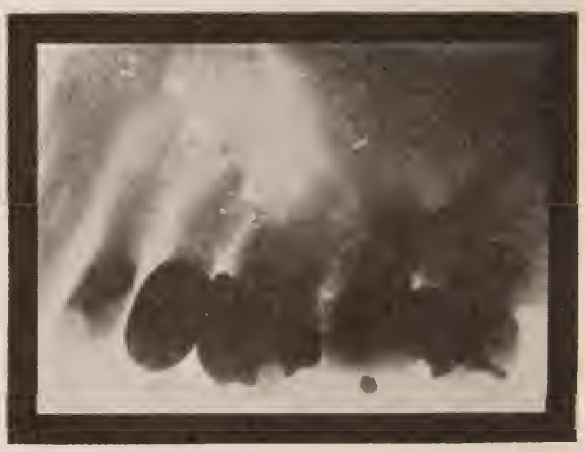

Fig. 19

Fig. 19. This is the radiogram of a physician's mouth, showing three putrescent teeth, all communicating with the antrum. These teeth all had to be properly taken care of and the roots filled before the source of infection was removed; then we opened through the canine fossa and thoroughly curetted the antrum which responded nicely to treatment and cleared up in about a month.

Fig. 20 shows antrum infected from a crowned second bicuspid.

Fig. 21. Note the large area of absorption over the region of the first molar. This patient had his antrum opened ten years previous, and there still remained a large fistula exuding quantities of pus when the cheek was lifted up. On examining the nose I found the septum so deflected that the osteum maxillary was completely closed. I referred him to a specialist for correction, and after four days he called

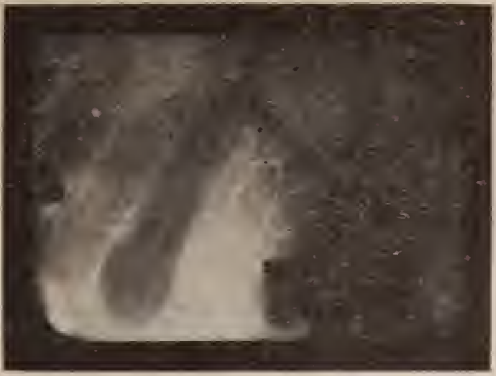

Fig. 20

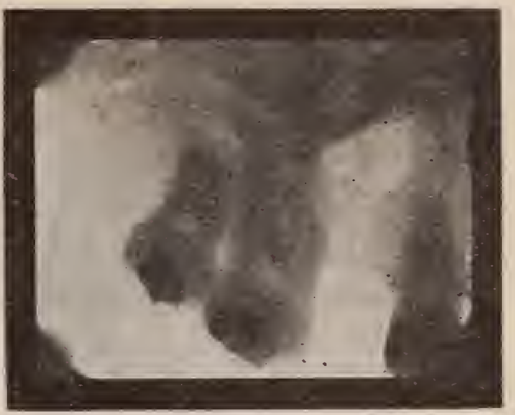

Fig. 21

up and informed me that the pus had entirely stopped flowing, and that he had not had any further trouble. It seems incredible that his antrum will clear up without surgical treatment.

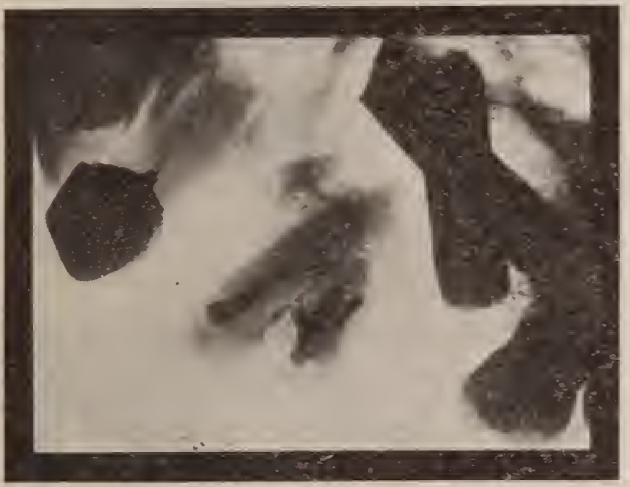

Fig. 22

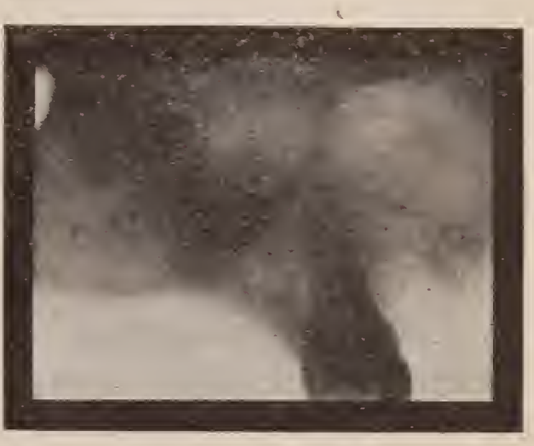

Fig. 23

Fig. 22 shows rubber drainage tubes that were lost in antrum for over two years, causing necrosis of the entire floor of the antrum. This is one reason why they never should be used.

Fig. 23 shows the entire bony structure infiltrated with pus from the antrum, necessitating its entire removal.

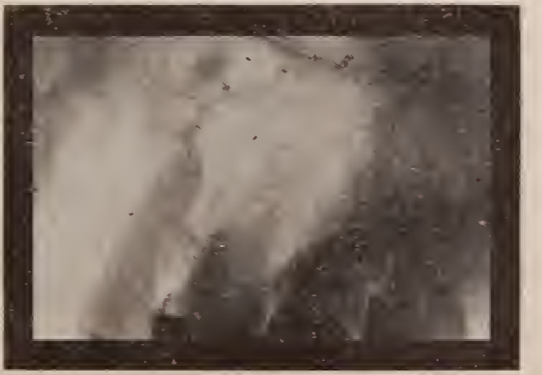

Fig. 24

Fig. 24 shows infection in the left antrum of seventeen years' standing, caused by a devitalized first bicuspid. There was a fibrous growth in the roof of the mouth and extension necrosis around the apex of the tooth, which necessitated its extraction. Recovery in nine weeks. The frontal sinus had to be drained before complete relief was obtained.

In all the cases that have come under my observation, only two were without dental origin, and if this is true, how can we expect men to perfect a permanent cure simply by treating the case without removing the source of infection?

In conclusion I wish to make a plea for more men to take up this line of work, so as to be in a position to diagnose and relieve these conditions, especially since statistics prove practically seventy-five per cent. of the cases are of dental origin and must be treated by a skilled dentist before permanent cure is obtained.

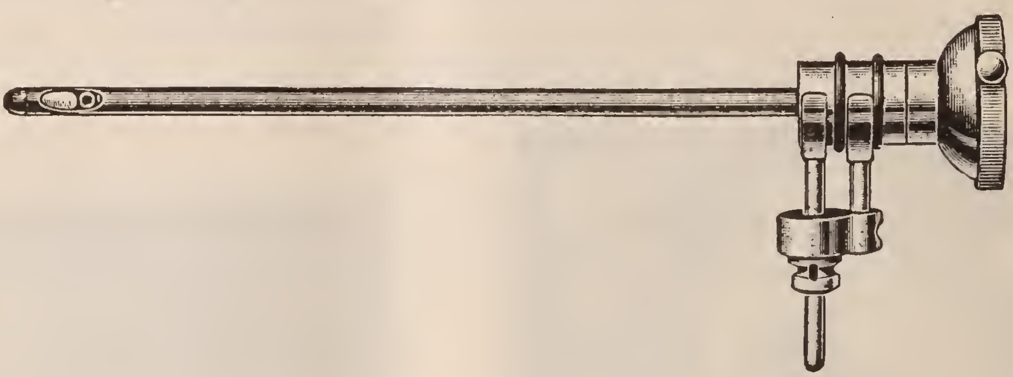

Fig. 25

Fig. 25 shows the acminaso-pharyngoscope. This instrument I have employed for antrum work, and it simply is a wonder in watching the progress of repair in the antral cavity. It contains a powerful light at the end and a wonderful system of lenses which reflects the interior of the cavity walls as perfectly as if you were looking at them directly. This enables the operator to introduce the scope at any time and see exactly the conditions of the antrum and how things are progressing.

With this light to aid you, it will be possible to know the condition, instead of guessing, both in post-operative examinations and diagnostic punctures.

National Association of Dental Faculties

The next annual meeting of the National Association of Dental Faculties will be held in the Green Room of the Congress Hotel, Chicago, Ill., August 2d, at noon. The executive committee will meet at 10:00 A.M. on the second. The meeting will continue through August 3rd.

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Care K. C. Dental Col.

FRACTURES AND DISLOCATIONS OF THE JAWS*

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PROFESSOR OF DENTAL SURGERY, UNIVERSITY OF MICHIGAN

COMPLICATIONS

These may be local or general. The *local complications* may be the result of the violence that is produced at the time of the injury. In fracture of the jaws infection nearly always is present. The extent of the infection will vary with the character and extent of the injury. The infection will result in suppurative necrosis of the sequestra and subsequent exfoliation. The infection rarely will be present in simple fracture of the jaws, but is common in compound fractures. When there is extensive laceration of the wound the suppuration usually will remain as a local complication, the pus escaping freely to the mouth-cavity between the fractured parts. The violence produced may cause the loss of vitality of one or several teeth. This may be followed by the occurrence of a dentol-alveolar abscess which, if in the vicinity of the site of the fracture, will markedly defer the process of repair. Or, if the abscess has formed some distance from the site of fracture, the pus which is developing at the ends of the roots may find its way along the line of fracture and become an obstacle to the process of repair.

In fracture of the maxillæ the antrum is frequently involved, and may become infected as well as the maxillæ itself. This presents another serious problem in the successful treatment of the case. Again, in extensive fractures of the maxillæ the brain-case may be involved by an associated fracture and coma or even death may result immediately.

The rupture of blood vessels is a serious, although infrequent, complication. In the maxillæ the rupture of the internal maxillary artery may not be amenable to early successful treatment and would be followed by fatal results. In fracture of the mandible, rupture of the vessels usually will cause little untoward sequella other than ecchymosis.

Secondary hemorrhage is one of the complicating problems in fractures of the jaws. This is quite a common factor in gunshot fractures. This comes on after suppuration has been established and is the result of infective inflammation causing disintegration of the hemostatic thrombosis, ulceration or sloughing of the walls of the vessels. This may occur any time between the beginning of the process of repair and the complete sealing of the fractured vessel.

The laceration or severing of the sensitive nerve trunks will lead to anesthesia of all of the parts peripheral to the fracture. Later on extreme neuralgia may occur on account of the nerve fibers becoming engaged in the cicatrix. The latter condition sometimes can be relieved only by neurectomy.

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Another local complication may occur by the short ends of the fragments (particularly is this true in compound fracture of the mandible) becoming engaged in the overlying muscles and fasciæ so that its reduction will be difficult. This is more frequently the condition that presents in those cases when reduction of the fracture has been delayed.

In these cases, after reduction of the fracture has been accomplished the continued impingement upon the soft tissues will delay the process of repair.

Trismus is an early local complication that nearly always is present. This is brought on by the violence that is produced upon the soft tissues and the temporo-mandibular articulation. In extreme cases a general anesthetic may have to be resorted to in order to obtain sufficient relaxation to make a diagnosis and subsequent reduction.

GENERAL COMPLICATIONS OF FRACTURE OF THE JAWS

The first of the general complications that will be considered is fat embolism. It is a clinical fact that free fat may be found in the urine during the first few days following a fracture. It is not clear just what takes place under these conditions. Some writers are of the opinion that the free fat is dislodged from the marrow spaces in the bones at the time of fracture and are carried into the circulation, and collect especially in the capillaries of the lungs. They also may pass through the lungs into the capillaries of the greater circulation, and then are found especially in the intertubular and glomerular capillaries of the kidneys.

If sufficient quantities collect in the lung capillaries there will be a marked disturbance in the circulation which may lead to the production of pulmonary œdema followed by pneumonia. This condition has been observed more frequently in alcoholics and in the aged.

The symptoms of fat embolism are rapid respiration, little or no temperature, face having a tendency to cyanosis, followed by unconsciousness which proves fatal. Pneumonia as referred to is a rather frequent complication. Interdental ligation in fractures of the jaws favor the occurrence by limiting the patient's ability to properly take care of the excessive supply of the secretions of the mouth at this time. Some of these bacteria-laden secretions may be inspirated and pneumonia set up, or it may occur as the direct result of fat embolism.

Of the late complications in fracture of the jaw, delayed union or failure of union is not uncommon. Delayed union is observed most frequently in fracture of the inferior maxillæ, and rarely in fracture of the upper jaw. Failure of union is rare. (*Fig. 22.*) In a record of 1313 cases of fractures in various parts of the body, only one failure of union was observed.

*"The anatomical conditions differ greatly in detail in delayed union, and may be classified under two groups: one containing most of the cases in which the fragments are united end to end or laterally, and more or less closely, by fibrous tissues, and another, very rare, in which a distinct joint is formed between them (pseudo arthrosis). The varieties of the first form are numerous, the variations depending upon the relative position of the fragments, the extent of the preliminary rarefaction, the amount of fibrous tissue and the presence or absence of a productive osteitis or partial ossification of the bone. The process of repair in any of the different forms imposed upon it by the character of the fracture and the amount of displacement, may be arrested at any period. The fragments may be in close apposition and united by a short, firm bond of fibrous tissue with only slight motion between them, or they may overlap in such a way that the surfaces of the fragments are not apposed, and the union is only by the thickened interposed connective tissue.

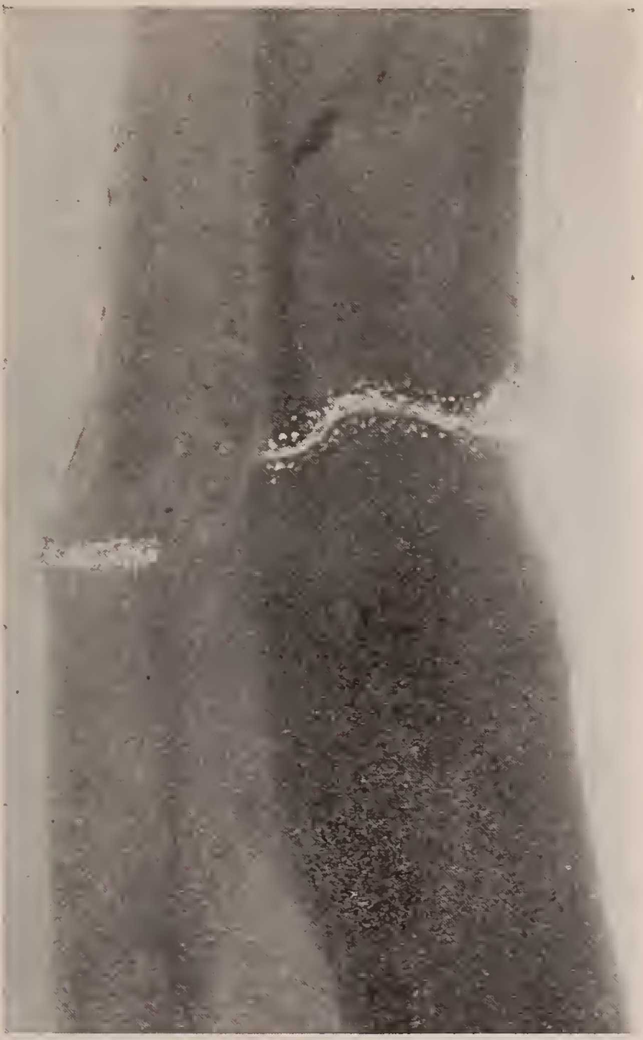

Fig. 22

In the second form, the creation of a joint between the fragments, they show in more or less complete distorted forms, joints with a fibrous

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*Stimson.

capsule embedding cartilaginous or bony nodules, a cavity containing a synovia-like liquid, and the ends of the fragments rounded, eburnated, usually enlarged, sometimes smooth and polished and covered with a fibrous lining.

In March (1914) *Journal of American Medical Association,* the author described pseudo-arthrosis in connection with the operation on the mandible for ankylosis of the jaws.

What are the causes of faulty union in fractures? There seems to be certain predisposing factors which, when present, will induce these complications, such as syphilis, alcoholism, tuberculosis; and such chronic diseases which will cause a marked lowering of the vitality of the patient.

Another condition which interferes with the normal process of repair of fractures of the jaws is faulty relation of the fragments to each other, with soft tissue interposed between them. Infection of the mouth is a factor that must be considered in the process of repair of fracture of the jaws. It is very essential that after the fracture is reduced the mouth be kept free from infection if normal repair is not to be delayed. A loose fragment detached from the periosteum may become interposed between the fragments and become necrosed, and will greatly delay the union. Then sequestra usually will exfoliate in time, when repair usually will take place. The treatment of delayed union consists in opening the tissues at the site of fracture and with a small bone drill insert several small holes over the surfaces of the fragments, thus stimulating granulation. It seems that after the lapse of time usually sufficient to produce normal repair, the property of osteogenesis becomes greatly diminished and a stimulation of the parts is necessary to re-establish the process of repair.

STIFFNESS OF THE TEMPORO-MANDIBULAR JOINT

This is seen soon after the fracture. When the joint itself is not involved in the injury, the stiffness is caused by injury to the muscles and soft parts which sets up œdema and a condition of trismus follows. In case the injury extends into the joint, the stiffness usually is brought about by the proliferation of fibrous tissue into or around the region of injury.

True ankylosis may result from fractures of the inferior maxillæ when the injury extends into the joint. (*Fig. 23,*) †In these cases if the articular cartilages be preserved in whole or in part, they sometimes undergo direct metaplasis into fibrous tissue or fibro cartilage, or into mucinous tissue which gradually become fibrous. In many of these cases the amount of fibrous tissue is not great and the ankylosis is produced mainly by cartilage and bone. Immediately following a fracture, when the joint is involved, there is more or less abundant hemorrhage into the joint. Later inflammation sets in. The capsule and surrounding parts become swollen and edematous; infiltrated with inflammatory products. There is an effusion into the synovial cavity. Portions of the coagulum may persist and become organized, forming osseous tissue in the joint. Thus the cartilages gradually are transformed into a vascular fibrous or fibro-osseous tissue. The joint cavity is traversed into a number of small spaces bounded by dense fibrous tissue and containing synovial fluid. In the advance stages the whole of the articular cartilages may disappear and be replaced by fibrous tissue. Secondary changes take place in the newly-formed fibrous tissue, and in time is converted into a mass of spongy bone and complete osseous ankylosis results.

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†Lyons, Journal A. M. A., 1914.

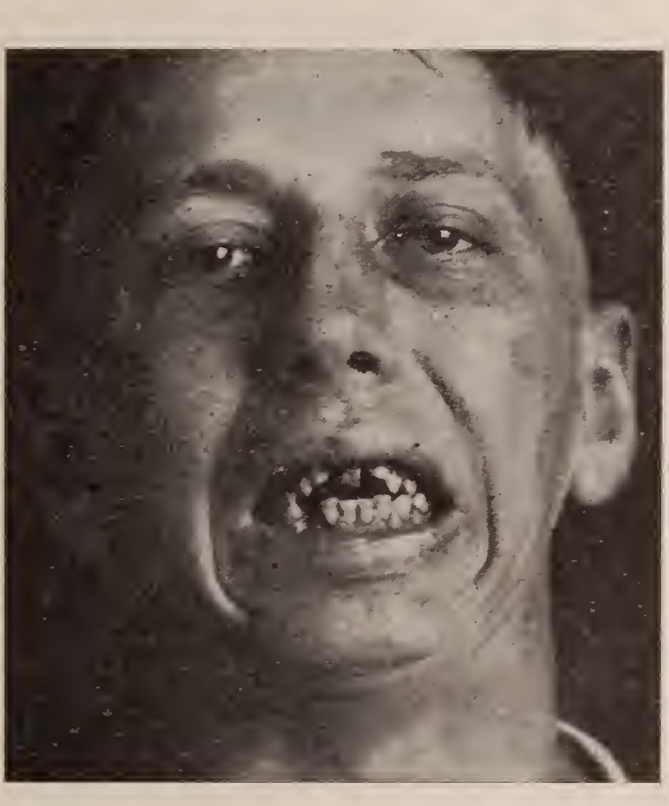

Fig. 23—Result of fracture of the condyloid process in early childhood.

In the treatment of fracture of the jaws by interdental ligation, there usually will be considerable stiffness of the joint following repair, on account of the inactivity of the parts during the time the reparation processes were taking place. This is more marked at the time of removing the ligatures. The stiffness will disappear gradually under use of the jaws, unless the joint itself has been injured and the changes referred to above have taken place. If the muscular tissues have been violently injured, there may be cicatricial adhesions or a shortening of the muscular tissues which may permanently prevent the normal opening of the jaws, after repair has taken place.

(*To be continued.*)

THE CARE OF THE DECIDUOUS TEETH AND PROPHYLACTIC TREATMENT*

BY J. W. PIERCE, D.D.S., COLUMBUS, GA.

MANY WRITERS on dentistry consider the temporary teeth of more importance than the permanent ones. The proper care of the infant's mouth previous to first dentition is very necessary, because dentition cannot take place in an unsanitary mouth.

The majority of babies suffer a great deal at times from inflammation of the mucous membranes of the mouth, known as different forms of stomatitis; this is caused by uncleanliness and can always be avoided by proper sanitary treatment and the use of many simple means by the mother or nurse. I think it just as important to prepare the mouth by sanitary measures in order that the eruption of the temporary teeth may be normal and painless. Nature did not intend for the dentitional period to be painful, although it very often is so, on account of malnutrition or other disturbances of digestion caused by unsanitary conditions of the mouth. There are many micro-organisms to be found in the mouths of infants; not of a severe type, but pathogenic enough to produce many of the ailments that babies are accustomed to have.

If a baby is fortunate enough to have had the proper care in every particular, it will have a perfect set of teeth in a perfect arch.

Now, the proper care of these teeth cannot be over-estimated, for the future destiny of the child actually depends largely on the condition of these first teeth. They should be kept thoroughly clean at all times, thereby preventing decay. A clean tooth will not decay at any time unless it is deficient in the lime salts which are essential in the building of a perfect tooth.

A child's teeth should be watched closely and if any small cavity is discovered, it should be filled at once. If neglected, decay and disease will follow, and there is no telling where it will end. The results may cause the child to suffer excruciating toothache, and many sleepless nights.

These very first teeth should be carefully filled and preserved. It is most important that the child should masticate its food well so as to give strength and health to the body to better be able to resist all forms of disease. These teeth should be carefully preserved so that they may remain in the mouth, performing their work until the time comes for them to drop out, or be pushed out by the permanent teeth. They should be preserved because nature wants them to perform their function so as to give health and strength to the developing body. Nature wants these teeth preserved to hold the arch in proper position and so retain the beauty of the mouth and face. There is nothing in the world more beautiful than children with teeth well preserved, and every child has a right to expect this care.

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*Read before the Georgia State Dental Society, 1917.

It is not so difficult to teach children how to care for their teeth in early life; they are great imitators and all they need is to be taught by the mother, but the mother first must be taught by the family dentist. Then both mother and child will become interested and the premature loss of the child's teeth may be prevented; that is, the loss of these temporary teeth, once considered of so little importance but now known to be necessary not only to ward off pain and suffering, but to increase health and happiness throughout life.

Children's teeth should be preserved because, if neglected, unsanitary conditions of the mouth result, and just such conditions form the most efficient bacterial incubator known to science.

These temporary teeth can be preserved with far less trouble and expense than if neglected and allowed to decay, for this involves suffering and nervous strain upon the whole system. Decaying teeth interfere with the organs of the body in various ways, often bringing on some disease difficult to control. The resisting forces of the body, so essential in warding off diseases liable to attack children, are lowered by neglected teeth. The teeth, then, must be cared for if children are to develop into strong, healthy men and women. Can we reasonably expect children with decayed teeth and unsanitary mouths to grow up to be healthy adults? Can a race thrive whose children are so affected?

The proper care of the temporary teeth insures the permanent ones to a large extent against decay. Well cared for teeth are more apt to erupt in normal relation to one another and not in an irregular and crowded manner, as often is the case where the temporary teeth are lost too early, or where they are allowed to remain in position too long.

The early loss of the baby teeth nearly always retards the proper formation and growth of the maxillary bone, so that when the time arrives for the eruption of the permanent teeth, there has not been sufficient development of the bone to accommodate the larger growth of the permanent teeth, and the result is they are irregularly erupted in a malformed arch.

On the other hand, if the temporary teeth are allowed to remain in the child's mouth too long, the results may be equally as bad, as they will retard the eruption and development of the second set, pushing them out of proper position and causing an ugly irregularity.

See, then, the importance of carefully watching the temporary teeth for the successful development of the permanent teeth depends upon it.

It is a well-established fact that clean teeth seldom decay, so that the habit of caring for the teeth and gums at an early period is more apt to last through life, insuring good teeth in old age. So many people attach little or no importance to baby teeth, while the fact is, as I already have said, they are more important than the permanent ones in developing a healthy and well-balanced man or woman. Sound and clean baby teeth are worth everything to a child.

First, they are the organs of mastication. Should a cavity or tenderness develop in a baby tooth, the child no longer masticates comfortably, so it bolts its food; this causes its body to starve for nourishment when it most needs it, preventing its physical growth and delaying the advance to perfect man- or womanhood.

Teeth as organs of mastication are more valuable to children from three to six years of age than to adults, because the digestive organs of adults are better able to cope with unmasticated food.

During the last few years more has been written regarding health and right living than ever before. Thousands of children are suffering for the lack of nutritious diet. The proper feeding of children is one of the most important factors contributing to the conservation of the temporary teeth, so necessary to the child in every particular. Its food must contain certain mineral elements for the building of bone and tooth structure, and this requirement is being neglected every day just as much as the care of the teeth themselves.

No wonder children fall short of the work that is expected of them in school. A good set of teeth and a good education are the greatest assets a child can have with which to fight life's battles. Good teeth and a clean mouth are the most efficient weapons with which to combat disease of all kinds.

Statistics have demonstrated that children's teeth are better cared for now than they were a few years ago. In nearly all of the large cities, and in many small ones, compulsory examination of the children's teeth is made, and parents are required to have them put in proper condition.

Free dental dispensaries are fast being established throughout this country to take care of the poor children who are not able to have the necessary dental work done. Any town or city that does not take good care of its poor children, and makes no effort to do so, is not only not up to date but far behind the times.

The time has come when a city must realize that a dental infirmary is one of the most economical propositions to better eradicate contagious and infectious diseases so frequently breaking out among children. It is a well-known fact that thousands of children die annually in this country from preventable diseases, and the source of many of these diseases readily is traced to bad teeth and unsanitary conditions of the mouth. Think what a loss to the state and nation this represents! The value of a child cannot be estimated nor calculated.

It is necessary for the growing child to have hard food to chew, and good temporary teeth to chew with, in order to develop the bones and muscles of the face. Therefore, these teeth must be properly cared for as the most important means for preserving the health and decreasing the death rate of children. The undertaker will not call so often if the mother will undertake to assist the child in caring for its teeth. If with proper care of the mouth and teeth its resistance to contagious and infectious disease is built up, your child will grow up and develop into a strong man or woman.

CONSTRUCTING PLATE BITE OR TRIAL PLATE*

BY WITHERSPOON WALLACE, D.D.S., ATLANTA, GA.

It is not my desire to go into the minute details of the construction of trial plates, but will only give a brief outline of the technic I use, which is not original.

In the beginning, of course, we obtain as accurate an impression as possible. I prefer a muscle-trimmed impression. Then the making of the model, which should be of a material that will not break in the process of vulcanization.

The trial plates of the bite should be adapted thoroughly to the model at this stage, using some kind of material that will not change its form by the heat of the mouth. I use Dentsply base plate, which easily is adapted, using dry heat over a Bunsen burner with a low flame. By adapting to half of the model at a time this can be quickly and neatly done. In trimming margins, warm and use shears. Some form of extra tough pink paraffin wax is used for building up the trial plates.

For full upper and lower denture both bites should be worked up ready for trial; place upper trial plate in mouth, trimming or building as the case may be until the wax is about one-sixteenth of an inch longer than the lip. Then place lower trial plate in mouth, trimming wax until lips almost touch in repose. Remove lower, warm occlusal surface of wax until lips touch in repose, this being one of the most important steps; we now can add to the wax, getting the proper fullness of lips and cheeks.

Test adaptation of bites by placing thin-blade instrument between bites near median line; if they remain firmly seated our adaptation is correct; if not, slightly trim at heels of bite or posterior surface.

We now are ready to mark median line, which is another important step. As we sometimes are misguided by frenum, stand in front of patient, observing closely chin and nose; then stand back of chair and have patient close mouth four or five times, noticing each time relation of lower to upper. This will insure correct median line; then mark corners of mouth or position occupied by cuspid; insert instrument at median line with lips in repose; gently carry to angles of mouth and mark on wax; mark high lip line by having patient raise lips as in smiling for length of six anteriors. For low lip line, have patient depress lower lip and mark wax. The space between the corners of the mouth will determine the width of teeth.

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*Read before the Georgia State Dental Society, 1917.

I use some form of staple, two to the side, to seal bites in mouth. By heating and inserting this will insure stability of bites until mounted on articulator. The compensating curve can be worked out easily at this stage, owing to the form of articulator in use.

PRESIDENT'S ADDRESS*

BY DR. G. H. SMOCK, ERIE, PA.

FOR FIFTY-FOUR YEARS Lake Erie has been bounded on the north by the province of Ontario and on the South by the Lake Erie Dental Association. Our society is gaining in membership and prestige each year, and is on its way to its goal. We have some 1200 members of the state society in Pennsylvania; of these only 750 are members of the National. This society now has 166 members. In our local district in Pennsylvania and outside the odontological district of Pittsburgh, we have 115 members, only nine of whom paid dues in the National last year through our society. This is actually deplorable. We must have been remiss in bringing the matter before our members in its true light. In every other state in the Union membership in the National is compulsory upon component members. It is inevitable that we must do the same.

Our Research Institute must be supported if we ever are to become a learned profession. The extra dues are only two dollars, which includes the monthly issues of the *Journal of the National Dental Association*, and which is the official bulletin of the Research Institute, and the official organ of the Preparedness League of American Dentists.

The revelations regarding the infections we have been "sealing in" the mouth are nothing short of astounding. Much, if not all, our root-canal work now is defenseless malpractice unless free use of radiography is made. We do not believe it wise for every operator to buy a machine, as better results often may be obtained with one man doing the radiography for a group of from three to an indefinite number of practitioners. A note of warning I wish to emphasize, is that when we get radiographs of a canal which another operator has treated we must bear the golden rule in mind in giving the patient our diagnosis. Remember, no man does perfect root-canal work. Also bear in mind that at least ninety per cent. of your own root-canal work will not stand the X-rays. If we condemn by word of mouth, each the other, we shall destroy all imposed confidence of our patients and consulting physicians.

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*Read before the Lake Erie Dental Society, 1917.

We have been culpable in the slowness with which free dental dispensaries are being established. The idea seems to have gone out that a town of five or ten thousand is too small either to need or to finance one. The opposite is the case. The small town has a better average of dentists than the city. The need is the same. The public schools are supported financially without complaint—merely because we are educated to it—it is custom. Health to the child is by all odds the first essential. If, then, a child is born into the world, all essentials are owing to him by both the parent and the state.

When the free public school system was first established in Pennsylvania we had a veritable civil war, the heavy taxpayers objecting to paying for the education of the poorer man's child. Now it is accepted as a corrected principle merely because it has become custom.

The care of children's health is far more important. It is, therefore, inevitable that in a short time not only the mouths of the poor but of *all* will receive not only free care, but that it also will be compulsory.

Less than two dollars per year, if carried out systematically, will keep the average child's mouth in health. It is criminal neglect that we are not doing it. It costs forty dollars per year to keep a child in the grade school one year; sixty dollars in high school.

I have three children in school, costing the board $120 per year. I pay $48 per year school tax. I am, therefore, accepting so-called charity to the extent of $72 dollars per year, and do not feel humiliated. There is no argument against universal free health.

According to the Russell Sage foundation, twenty-five per cent. of all the children who are retarded in school are being held back as the result of physical defects. Twenty-five per cent. of retardation is not considered very high in some cities. Schools in some cities now are having as high as forty-two per cent. If only two children in a class of forty were retarded because of mouth defects, it would cost the board $80, or enough to care for the mouths of the entire class.

We do not have the usual loss of time in a dispensary which is experienced in a private office, such as answering telephones, listening to nonsense, etc.; we are therefore more efficient. With an operator of average ability, easily twice as much work in the same number of hours may be done as in private practice.

The operator may be paid more than one dollar per hour, and still turn off work at a cost of one-third of the minimum fees of the poorest fee-fixer in this room. In a city of ten thousand, a dispensary open two morning sessions of three hours each per week will care for the mouths of all children from six to fourteen years inclusive, who are from families unable to pay. For this work a suitable outfit may be installed for five hundred dollars, and if you pay the operator one dollar and sixteen cents per hour, and nurse at the rate of fifteen dollars per week, the total expense for services and materials will come within five hundred dollars per school year. It is perfectly simple and easy. I am speaking now on a basis of ten thousand population. We must size ourselves up to this situation.

For the first time in its history this society is called upon to furnish a possibly high percentage of its members for duty in the Dental Reserve Corps of the army and navy. A census has been taken by the society of our members in Pennsylvania, outside of Pittsburgh. Of our 115 members in this district probably one-half have already signified a willingness to go if needed. By this time a large percentage of our members in this district have signed up an application blank as required by law, been endorsed by your president and now are at the call of the Surgeon General. The response to our appeal has been nobly made.

It is the wish of the Surgeon General that each man go for his country in the capacity where he will be of most service.

The duties of this office in the past year have been to me an inspiration. I wish to leave with you a message: Get away from yourself and think and feel in terms of professionalism. If our lukewarm brothers get in line and support the profession as nature's law and a professional conscience dictates, we shall soon be fulfilling our worthy mission, and our reward will be seen in greater wealth, greater prestige and increased usefulness for our fellow man.

Clasps With Occlusal Rests

An occlusal rest is an essential part of a clasp in all cases, and at all times, for the reason that in proportion as a fixture may be movable, and may be supported entirely by the underlying soft and hard tissues, in just this same proportion will resorption of these underlying tissues be stimulated, and subsequent settlement of the entire fixture take place. In time, the result of this mobility and settlement will be evidenced by irritation of the soft tissues around the necks of the supporting teeth due to the impingement of the clasps; by an unnecessary degree of mechanical abrasion of the supporting crowns, and the ultimate complete loss of occlusion and usefulness. All of these may be largely, if not entirely overcome by an occlusal rest, and therefore such must be provided even though some grinding of the crown of the tooth to be clasped, or of the opposing tooth, or both, may become necessary.—*H. J. Goslee, Dental Items of Interest.*

INTERNAL ARCH CORRECTION

BY FRANCIS E. WILLIAMS, D.D.S., LOS ANGELES, CAL.

MY FORMER ARTICLE on this subject dealt with it more in a general and comparative way; this will detail my method and handling of the subject in as plain language and manner as possible, that is, keeping away from technical language, words which convey little or no meaning to a person not familiar with dental terms, so that any person picking up a magazine may, upon reading, have more understanding of the subject being dealt with.

I intended that this article should have been completed before this, but as one works (keeping in mind the practical details), improvement becomes a matter of course, reducing methods more to the rotary, and as the day ends, upon criticising one's work, which must be done in order to proceed, one tries to find some way for improvement, to make some change for the better, or he is hopelessly out of the running; thus, I say, I am improving and smoothing down the rough edges. The bunglesome back-century is eliminated, such as jack screws, manacles, exterior correction, etc. (meaning "and such"), and I expect to keep on in the same manner.

In treating my cases, I can hardly say they are uncomfortable, and still not all are comfortable. For instance today, a patient, a young man, came into the office with his jaw somewhat swollen, due to too much strain (pressure) from first application of the rubber ligatures, for the shifting of occlusion (Baker anchorage) and irritation caused by food having entered between the gums and an erupting third molar, and inflammation caused by holding a violin against the jaw at this point while playing; but this is the first case I have had of considerable swelling during shifting of occlusion, due to the causes named and to persistent youth, in application of too great pressure, at once causing the overload (greater than nature could handle well at the time) and lack on my part of cautioning the lad against too great pressure at the start, but that we would do our hurrying later on, when the tissues were accustomed to the pressure.

The anchorage for the shifting of occlusion could as well be placed on the inside of the arch, but I believe is better outside, as it is not bunglesome the way I have it attached; "there is no buccal tube to irritate the cheek and force the cheek between the teeth as they are closed," and is hardly seen. The first case of interior anchorage I ever saw was a patient of Dr. Case, and the workmanship on the retainer he had on I despair of ever equaling; but in a comparison of methods, exterior and interior, we are going to make no apologies, because we may expect a further refinement of improvements in the future and since nothing, to our mind, could be worse, in the correction of cases than the appearance, bulk and irritation of the old exterior method;

as there can be no chance of anything being worse, any change must of necessity be an improvement; good results we got in spite of our mechanically wrong treatment. The patient paid the cost in pain and appearance.

Nor are we, as we said, advancing a theory only, unapplied, for every day it is needless to say we are applying this theory and getting very satisfactory results; *we are more intrenched in the application of interior arch correction, as we take cognizance of the ease with which the teeth are moved* and the *rapidity* of movement, all to the good, and we are not riding roughshod with spiked boots, as it were, over the membranous tissue.

APPEARANCE

Fig. 1 illustrates a case under full correction, the case requiring the usual expansion of the arches and rotating of turned and twisted teeth, and the moving bodily forward of the first bicuspid teeth to make room for the second bicuspids.

Isn't the appearance of the case under correction encouraging? One could hardly ask more for appearance even under retention. If there were more torsion of the teeth there would be more bands showing, as a band is the only way we ligate to a tooth. In the shifting of occlusion there would be no more bands showing, because we already have the base for the attachment of rubbers, the attachments on the bands would be the only difference at any time from the present appearance of this case.

If an exhibit of one of these cases were made before prospective patients, in comparison with exterior correction, never in the world would they allow the exterior appliances on their teeth; gradually they will know and will demand the change, and if you are not able to supply their wants, some one else will. Patients demand these things when they are thinking of having their teeth corrected—improvements to their good appearances pleasing to them.

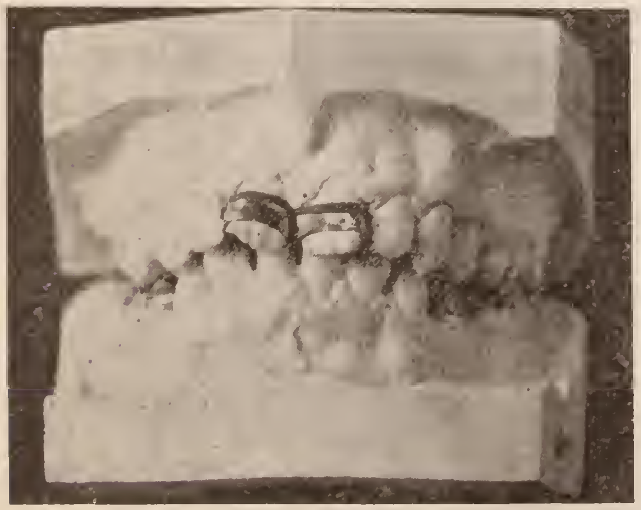


Fig. 1.

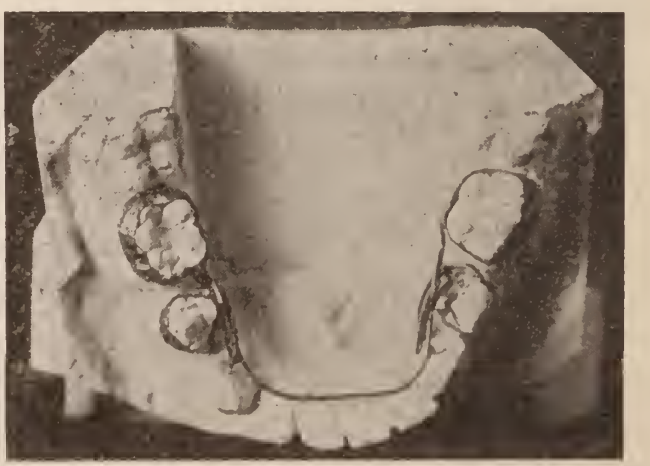


Fig. 2A

Fig. 1.—Showing the external appearance of this case, under full movement in the correction. The rubbers around upper centrals are the torsion rubbers.

Fig. 2A.—Showing lower interior with adjustment arch in position, moving bicuspids forward and opening up the space for second bicuspid. The getting of space for tooth] with adjustment arch is perfectly easy.

First: That they shall present an appearance as good as possible while wearing the appliances during the time necessary for correction.

Second: That they shall be as comfortable as possible during the time of correction.

Third: That the time required for the correction be as short as possible.

That is the way you would look at it if you were having your occlusion corrected, and of course you would not recommend something different for someone else. *That spells interior arch correction.* No other method can fulfill these demands.

Figs. 2A and 2B illustrate the models opened, showing the interior of upper and lower with appliances adjusted. These cases are not *smoothly penciled drawings* for the *application of theory*, but appliances manufactured on the models, which is always harder than working on the patient.

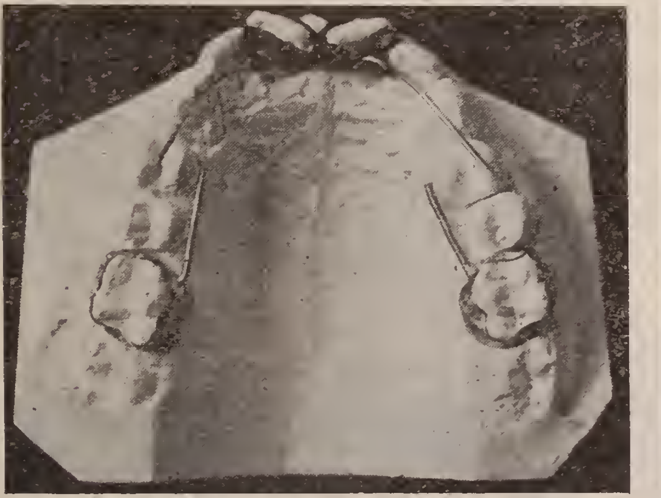


Fig. 2B

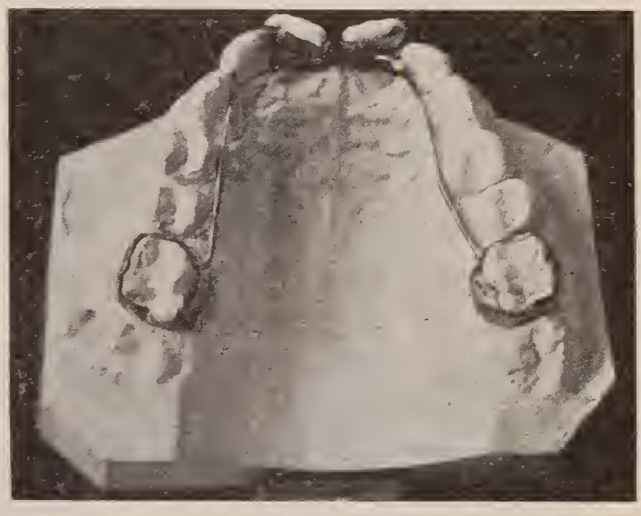


Fig. 2C

Fig. 2B.—Showing arch as released from tubes on anchor bands, but still held in position by centrals. This shows clearly anchor bands in position, which act equally well for all expansion and retention.

Fig. 2C.—Showing appliances adjusted for simple expansion and torsion of centrals. Centrals also act to hold arch in position.

The appliances as seen are not obstructive in bulk and the interior and exterior surface of the anchor bands present a clean, smooth appearance, not in any way irritating to the tongue, gums or cheek (there are no ends of rods in any case which are not twisted in out of the way), no arch end to stick into the cheek; there are no bolts, threads and nuts, and never are.

There is a little depression or jog on the lingual and palatal side at the mesial surface of the first molars, and this space is used to its full advantage in making attachments to the anchor band; thus the first molars usually present an appearance of entire smoothness, the only exception being the spur for attachment of rubber ligature, also to bring pressure to bear on second molar by spur soldered to interior or exterior surface of band. This smoothness is of vast importance, as there is no surface of the teeth in the mouth as that in front of the molars which, if appliances project therefrom, may so irritate the tongue in its movements, as that at the lingual surfaces of the molars; and any obstruction on these surfaces (bulky or rough projecting appliances) which may retain food products, will readily cause an irritated and receding gum surface as they, being the first permanent teeth, erupt, and are the longest resident teeth in the mouth, as well as the first subject to the ravages of decay.

The lingual-mesial surface of the first bicuspids or premolars is used as well for appliance attachment, so that there is little projection in the mouth. Upon both the upper and lower arches the palatal and lingual surfaces immediately approximate to the six anterior teeth *are not* closely occupied by the tongue. This offers considerable opportunity for appliance attachment and is one reason why retainers are so little objected to by the patient (the other reason is because they are on the inside of the arch); but the old band and spur used for the attachment of teeth was objected to because of the spur offering a pointed surface projecting into the mouth.

The upper arch in *Fig. 2* shows the appliances adjusted for simple expansion and bands on the centrals for rotation.

BANDS

I use band material, gauge 35, for the cuspids, bicuspids and molars, and 37 or 38 for the anterior teeth. For the arches and retainers I use 22-gauge wire when expansion needed is not great in the area of the second bicuspid and first molar, and 20-gauge where the smaller cannot be used to advantage. I claim one should use the smallest gauge where possible, because it is more pliable and active. The two gauges answer all of the purposes for arches, but I use gauge 19 *soft* and 21 *soft* for attachment to bands. Twenty-two gauge soft is hardly stiff enough to hold when it is bent around an arch.

It is extremely hard work to find arch material of the right degree of hardness; it is either too soft and has not the proper spring, or too hard and very brittle. Occasionally I get the temper about right, but upon re-ordering, cannot get it the same. I speak of non-corrosive metal; with iridio-platinum the difficulty of obtaining proper metals is about the same, but a little better. The band material most of the time runs less than the gauge ordered. I have ordered mostly from one firm in Chicago for the last ten years.

In my attachment of arches to bands I do not use the soldered attachment for the appliances, and even in retainers also I use the tube attachment; it makes the appliance flexible and in making changes only such portions as desired need to be removed.

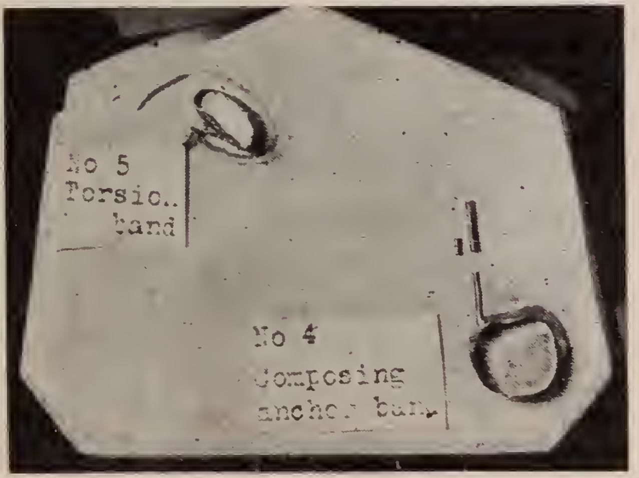
TUBING

The tubing I use is thin-walled, and is hardly discernible from a continuation of the arch (wire). I order it in the two sizes to fit the arch material (20-22) as given above.

Tubes cannot be attached successfully at their ends directly to bands; either the tube will break where the solder leaves off and the thin wall of the tube begins, or where more solder is used it runs too far in the tube, or the tube tears off and takes a portion of the band with it. The tube must have greater support and be more flexible. So I run a rod just inside of the end of the tube with a very small quantity of solder and attach the rod to the band. I like to have the rod an eighth of an inch long, at least, between the end of tube and band, so that I may adjust the position of the tube by bending the rod, which is thoroughly annealed, though of gauge sufficient to retain the position it is placed in.

In changing the position of the tube the rod will stand considerable bending without breaking, while if the tube were attached directly to the band, its position could not be changed without damage to the tube or breaking it loose from the band. The latter I have done a good many times in learning to do differently.

Fig. 3 shows anchor bands made and in position. In Case I, *Fig. 2B*, lower molars banded—and on the different models also. The band is composed of the same number of parts (see *Fig. 4*) no matter what is the determined length of rod and tube except on first bicuspids. I sometimes use the same gauge rod to solder to the band that I run into the end of the tube to stiffen it, but for molar bands the rods should be same gauge of tube to give greater strength and in soldering butt the rod onto end of tube and the rod support in it. No extra soldering is needed, as that left from soldering the rod in tube is sufficient and it will draw back out of the tube somewhat.



Figs. 4 and 5

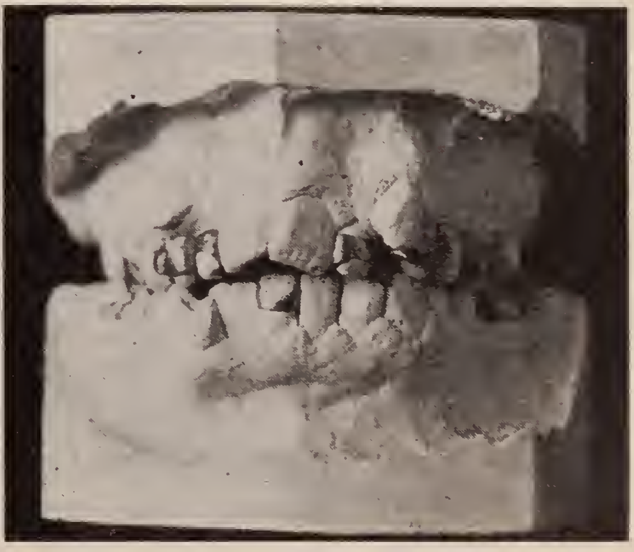


Fig. 6

Fig. 4.—(No. 4)—Composing anchor band; showing the different parts. (No. 5.)—Upper; showing torsion band.

Fig. 6.—Showing external appearance of this case under full correction. This is a difficult case to correct, but notice the freedom from all that is objectionable.

Figs. 4 and 5. Composing anchor band. It might be offered that it is going to considerable trouble to make an anchor band. Judging from what has been used in the past, how it looked and felt, I should judge it was necessary a little more attention be paid it, and I offer changes, though taking no more time, the new bands each being a special one to fit the case, requiring considerable time in preparation but are a comfort to the patient, are practical in every way and look very well; it is better that proper bands be made at the start; it costs the orthodontist less time in the long run and is surely more satisfactory from the patient's standpoint.

Placing the ends of the arches in the tubes for expansion where tube is attached solidly to band, requires an extreme bending of the arches to a degree which reduces their ability to expand or even if expansion is not desired, the arch, after it is placed in position in the tube, will not retain its original position (contour); consequently, with the rod connecting tube to band, the tube may be thrown at an angle inclined towards the occlusal surface of the teeth; at this position the ends of the arch are easily inserted in the tubes; then, upon bending the tubes and arch into position, pressure is exerted forward, not otherwise obtained except by the *condemned thread and nut* attachment or by the rubbers, as I shall later explain.

When it is desired that the arch shall run through the tube, the rod attaching it to band is soldered to the side of the tube, preferably underneath the tube; if not, the rod is butted to tube in soldering as stated.

EXPANSION

Where expansion is required not great in bicuspid region, I solder tube to band with short rod attachment, to place on the right side of the arch, as on left side of mouth it is easier to adjust the tube after arch is inserted (right-hand position). On the left hand the rod connecting tube is usual length.

This method I find requires little room in the mouth, is very comfortable, has no heavy, sharp shoulders and facilitates changes.

Attachments to bands on bicuspids and molars should not be at lower edge of band, but up one-sixteenth inch or more, as if attached too low they act as a shoulder and help to retain food in contact with margins of gum.

Another great advantage with the rod connecting tube to band (see cut above) is that it is possible to control the rate of expansion in the area of the bicuspids and molar so that it comes in the proportion we want it in the different areas; to illustrate, the first bicuspid or just in front of it is generally the area where the greatest expansion is necessary; then if the ends of the expansion arch are in a position equal to the approximating surfaces of the bicuspids, the first bicuspid will move the faster, as the strength of pressure is from the convexating position of arch and greatest resistance distally, at anchorage.

This pressure may be brought to bear just above the gum line on the enamel surface of the teeth, and without touching the gums, force the teeth to expand in their relative perpendicular position. The rod length in making anchor band is gauged when it (band) is made, in proportion to expansion necessary.

Using the old method of expansion, with the arch on the outside, you are dealing with a condition resulting from tube in solid attachment to band, which results in mesial torsion of the tooth used as an anchor. You have seen these results and so have I. They were met with in every case and the only way to prevent it would be a hinged joint at the point of anchorage; the arrangement under interior arch correction I speak of gives us the effect of a hinge pivot at point of anchorage.

ARCH ADJUSTMENT

This will be taken up later. Lower, under *Fig. 2*, shows it, but under altered conditions as there the first bicuspids are moved forward, making room for the second bicuspids; the first bicuspids are used as mesial anchorage instead of arch, which is allowed to slip through tube until first bicuspids are in position, ends of arches inclined into space in front of first molars.

TORSION BAND

It is to be hoped that no one who reads these lines is using the old band and spur, torture number three. The other two were, first, the clamped anchor band on the inside; and, second, those clamped on the outside and the threads, nuts and tubes on outside, enclosing the ends of arch. The arch being visible and with its anterior connections, condemns itself.

Fig. 5 gives a good idea of the torsion bands I recommend and use. The band is formed with the seam coming at the point on the tooth where the tooth is turned and extends (projects) the furthest in (palatally or lingually). Explaining further, look at the central incisors (upper) in *Fig. 2*, the seam of the bands to rotate them would be next to that position of the tooth coming the furthest inward on the palato-mesial portion; this seam is to act as a wedge between the arch and the tooth when the tooth is under pressure, thus helping in the turning movement by throwing that surface of the tooth outward. Now take a piece of soft 21-gauge rod and bend it at a right angle so that the end of rod is towards the seam of the band. This rod is soldered to band or the piece which is turned up, about one-eighth of an inch long with the bent or free portion of the rod coming nearly even with the opposite edge of the tooth from the seam, the bent portion extending out from band somewhat to give attachment for rubber or, in this case, the distal edge of the centrals, and the other end of the rod in a position moving directly into the mouth; it is then cut off at a sufficient length to bend around the arch, to help support the arch in front and to hold the tooth as it is turned around into position under pressure.

When the tooth is to be lengthened, or moved in a direction towards the incisal edge, the rod is soldered well up on the band toward the gum line, and as rod is bent around the arch under pressure, and arch is forced against the surfaces of the other teeth, the tooth banded will move forward toward the desired position. If tooth is to be depressed, rod is soldered nearer to incisal edge of band.

Another method of rotating which I resort to continually is accomplished by soldering rod as before mentioned, but only bending it so the free end touches surface of adjoining tooth; now I use a rubber to turn the tooth, taking a turn around the rod and above the band seam, around the labial surface of the tooth and between the rod and the gums, so rubber will not slip off tooth; now tie around arch, after stretching in the manner which Dr. Canning has taught us all to tie the rubber so it will not untie. Too much credit cannot be given Dr. Canning for introducing the rubber and displacing all wire ligatures. I am now using this same attachment for the correction of a lower (lady, 50 years of age), moving bicuspids forward and retracting anteriors, and my latest method for rotating is to solder a very light rod to anterior surface of band (buccal or labial) on the side of the band towards which the tooth is rotated, and at the edge of band extending towards the gums, the point of the hooked rod extending away from the direction in which the tooth is rotated. The rubber is fastened to this hook and tied from the inside. This hook is now bent close to the edge of band and is hardly noticeable and the rubber is not seen. This does away with the rubber being seen on the exposed surfaces of the teeth, the appearance of the teeth being all that could be desired.

With the wire ligature gone, the exterior arch and all clamp bands, nuts and trimmings also, the patient may come out in the open and surrender, with a fair chance of wholesome treatment. I understand the Canning rubber may be gotten at most dealers now; if not, the rubbers may be secured upon request or a communication to Dr. Canning's address in Denver will bring them. Rubber of that quality I have not been able to find elsewhere; it stands the tension and lasts.

I have attached the two central incisors (upper) in the manner explained in *Figs. 2.* This upper model shows adjustment arch adapted to simple expansion; it is simple and practicable.

Lower model shows expansion arch in position, the two first molars banded as anchors, supporting the tubes in the ends of which is inserted in this case a rod with another piece soldered on at an angle giving a V-shape for attachment of rubber.

The bicuspids to be moved forward (see *Fig. 11A*) are banded and a rod soldered on the distal surface, the free end running out to the lingual surface of tooth for attachment of tube, (which is one-quarter inch long and attached to rod near center of tube)tube to contain arch 22-gauge. This tube, open at the end, allows arch to run through it as the bicuspids are moved forward.

The distal free end of the arch connected with the bicuspid with arch running through, acts as posterior attachment for rubber band to move bicuspid forward. The rod in anterior end of tube connected with anchor band acts as anterior attachment of rubber band. The two prongs of the "V" rubber attachment are turned inwards and are bent around arch to prevent protruding in mouth. The rubber should be attached from inside arch.

This simple arrangement will move the bicuspids forward rapidly, holding their relative position at same time as they are being moved.

The molars are perfectly smooth, the necessity for which was mentioned above.

The arch in this case is also under lateral tension, to expand. With smooth surfaces, all obstructions are eliminated and no projection extends into the mouth further than the arch. None of the appliance is pressing on the gums.

Figs. 6, 6A, 6B, 6C, 6D, illustrate a case of lower retrusion (receding chin) with appliances adjusted for full correction. The mandible or lower jaw has receded a distance equal to the width of a bicuspid tooth on each side, necessitating the movement of the lower jaw forward this considerable distance in the correcting of this case. This may be done by either exterior or interior attachment as given below (under protrusion), but I prefer the exterior attachment as I have it attached, because it takes up little room and is out of the way. The anterior attachment (the buccal surface of the anchor band is practically smooth) shows very little in the ordinary case. If it is objected to, or because I wish the tension different, I put it on the inside. Either way is safe and satisfactory.

Look at this case from the standpoint of appearance. As far as the correction is concerned there is little from the appliances now to detract from the looks, and yet this is a very difficult case to correct. Besides the need of shifting the occlusion, the cuspids (lower) are in labio-eruption; the laterals being in approximate occlusion to the first bicuspids and the arches so narrow (constricted) they are quite like the typical V-shape arch of the mouth breather. This requires a variety of movements, testing the flexibility of any appliance.

Notice the entire absence of the arches and not a wire or ligature of any kind, nothing protruding from any of the few banded teeth for attachment to anything. How this case would look—how any case looks—with all the teeth banded, even without regard to any arches and (spurs) wire connections to the arches; and yet, I say, we will get a better tooth movement, a faster one and three-quarters at least easier one by my method, using the adjustable arch. (See *Fig. 10.*)

ARCH—ADJUSTABLE

Interior arch correction would not be successful without it being possible to so adjust the arch that movement in any direction is possible, that the arch may be enlarged, so its proportions may be so altered that corrections indicated are readily made. *The reason interior arch correction heretofore has been so much of a failure, is because of lack of facilities for proper arch adjusting and to the imperfection of suitable anchor bands, carrying the arch.*

The bunglesome exterior arch could not be used well on the inner arch, and its adjustments were too bulky and clumsy; they were not practical; threads on rods, shoulders and corners on nuts, are an irritation.

How, with any arch heretofore offered, is it possible to get readily (shall we say) bucco-labial expansion? Yes, we could let that surface of the arch in exterior correction stand out prominently from the teeth on the exterior surface and then haul the teeth toward it. That is a product of the past; while possible it is not practical because of its bulk, its crudeness, lack of comfort and looks. Let's forget it and turn to the present and future. The objections are sustained; they are eliminated by the procedure advocated and practiced.

With interior arch correction the arch is broken in the area of greatest expansion. It matters not whether it is one lateral or both or mesial and lateral expansion or mesial, the movement in any direction desired is sure and steady and withal swift. Any movement in correction must be steady from start to completion of case to get the best results and for patients to enjoy the least pain. Aside from the objection to looks and the irritation caused by *threads and nuts,* steady pressure is not consistent with them.

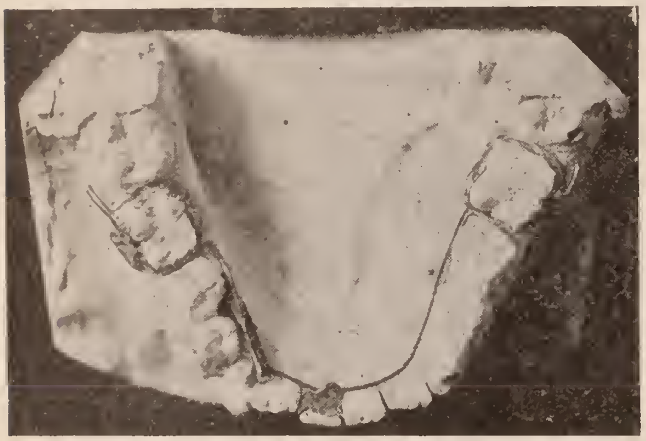


Fig. 6A

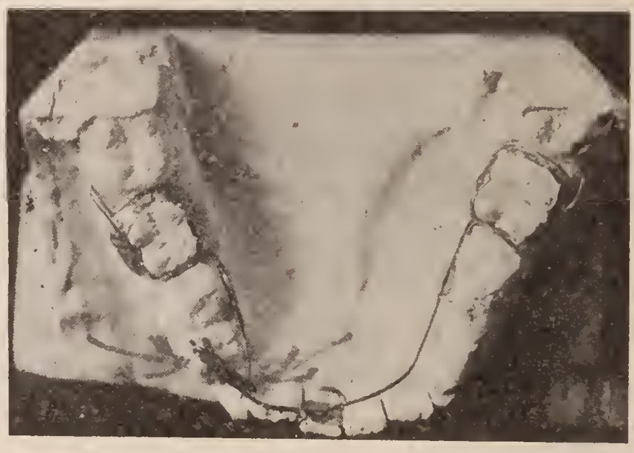


Fig. 6B

Fig. 6A—Showing adjustment arch on interior lower. The arch under tension by rubber ligature; continual pressure where, as with nuts and threads, there is a shock of movement tightening at each operation.

Fig. 6B.—Showing interior lower adjustment arch, sprung out of position but with rubber still attached. Showing position arch would assume, which is direction of movement required.

Figs. 6A and 6B illustrate the models opened; these are the entire apappliances used in correcting a case like this. To get the space needed for the upper cuspids with this method is perfectly easy. The rubbers do the work and the laterals are moved into position at the same time, as well the shifting of occlusion.

The arch on the upper model breaks at the mesial surface of the first bicuspids and in compressing it (arch) into position, of course it expands laterally in straightening and the laterals are thrown towards the cuspids and anteriorly in the expansion. The laterals also act as stays for the arch, holding it in position; also the pressure in this case would depress the laterals if not banded.

As soldering takes the temper out of the wire (unless precious metal is used), the ends of the arch are prepared to hold rubbers by taking a piece of thin tubing (just of sufficient gauge to snugly slide over end of arch), quarter of an inch long and solder rod (21-gauge) to center of tube, allowing *free end of rod to run backward beyond free end of tube one-quarter inch.*

ROOT MOVEMENT

Where the rods are liable to rotate in the tubes, use oval rods and tubes; also, to get forced root movement attach oval tube to band and run rod—arch—through tube soldered, and apply band to tooth under pressure. This insures perfect root movement

This gives attachment for rubber on arch without soldering to arch and taking temper out. When iridio-platinum is used solder directly to arch. As rod enters tube, it should be flattened on one side and tube pressed against arch, that tube may not turn when in position and rod pressed up against tube connected to anchor band, so that it secures expansion rubber perfectly and does not protrude into the mouth or impinge on the gums, but is out of the way. This acts as posterior attachment for rubbers.

The extension rod for anterior rubber attachment is slipped in end of tubes connected to anchor bands; it is made as described below by soldering rod to portion that enters tube, about one-eighth of inch, making "V" to hold rubber. This rod, of course, is used in the length desired, in this case just long enough to reach the laterals. Extension rod of gauge so it will not bend under pressure (20 or 21).

When strain on extension rod is too much laterally instead of lengthway of rod, "V" space to hold extension rubber cannot be made by soldering, but tube as described above for end of arch must be used and use rod with spring temper (not annealed). Otherwise contracting of rubber will bend extension rod.

The anchor bands are in position on the teeth. Take forceps and bend tubes up by bending wire next to band and at same time turn tubes buccally. Now tie your rubbers the length you want them (out of the mouth) and holding the arch in position, stay it by slightly bending spurs on laterals. Now fasten the extension rubber you have prepared—one on each side in this case. If greater pressure is desired, wrap the rubber two or three-fold around the fastenings.

The pressure now is in the direction desired. Bend anchor band tubes now into place against palatal tooth surfaces, with extension spur also, and spring arch into position underneath anchor band rods to hold it in place, as its direction of pressure is toward the teeth (it was bent inward into position). The arch in preparation must have been bent so its convex surface will fit posterior surfaces of front teeth when it (arch) is forced into position. If decided lateral pressure is desired and not anterior, break the arch back of anterior, as in case below, and pronounced movement results.

Arch in position now is being pressed directly anteriorly and by the contractions of rubbers additional movement is set up laterally.

First bicuspids are banded in this case only as anterior anchorage for bands in shifting occlusion, otherwise they would be unattached. Hook is soldered to distal-buccal surface of band on bicuspid and spur soldered to palatal surface and bent around arch to restrain tooth in place.

Fig. 6B illustrates also the lower. The anchor bands are made in the usual manner and spur soldered to bucco-distal surface of same for attachment of rubber for shifting of occlusion.

In this case, though both laterals of arch need expansion, the area of the right lower lateral needs the greater expansion and so the adjustment arch is broken at that place instead of each side as in the upper or in the center lower as given below. The arch is restrained by band on right central tooth. If pressure on lateral is too great, it would have to be banded to throw pressure lower down, to keep the tooth from being depressed.

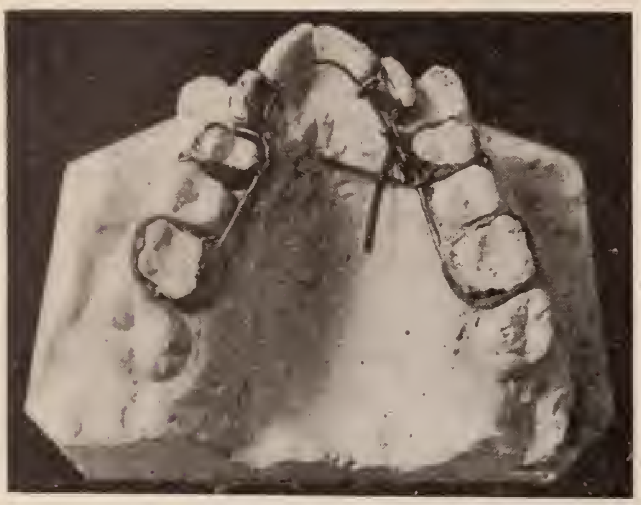


Fig. 6C

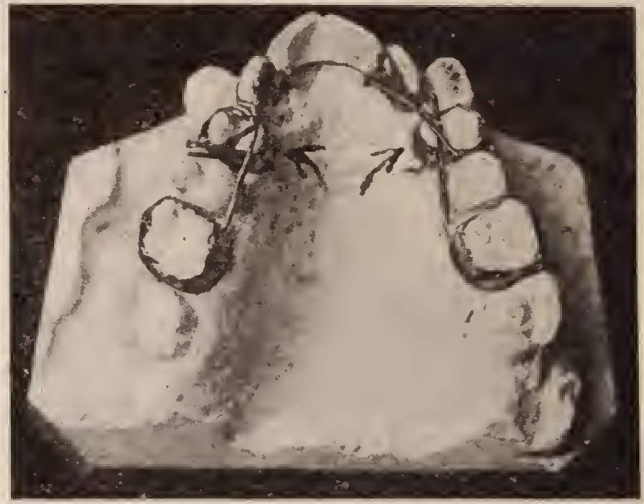


Fig. 6D

Fig. 6C.—Showing upper interior with adjustment arch in position for labial movement and great labio-buccal movement as required in this case. The tension of the rubbers causing the latter. One rubber tied and in position; the other ready to tie.

Fig. 6D.—Showing upper interior with tension on appliances removed. Appliance springs into position of rest.

When the expansion is sufficient to give room for the right cuspid, it will have to be banded for rotating. There are no decided projections in the mouth, no sharp ends of rods. Surface back of second bicuspids is free from any noticeable bulk, presenting a smooth surface.

ARCHES CONTINUED

There is no question about the expansion of these arches and in the direction desired, *for it is in expanded position when adjusted and before it is sprung into position.* The effort of the spring to assume its position of rest; otherwise all correction will fail.

I have had greater satisfaction with adjustment arch free and untrammeled at the break; except the fastenings spoken of, as it does not act as well in tubes, but leaves both ends of anchor attachment free.

DEGREE OF PRESSURE

This is determined by the manner in which the rubber is stretched in tying and the number of times it is wrapped around the fastenings as it is secured in place. Haste should not be our object at first, nor until the teeth are in active movement and tissues are used to this condition. The knot in the rubber band should be located so it will not be exposed towards the surface of the tongue. With appliances properly adjusted, once each week is sufficiently often to see the patient and then only mostly to change the rubbers, change shape of arch, or any possible repair.

Interior arch correction requires *no more* bulk of appliance in the mouth than retention at any time except that which is required for the adjustment arch, to get the expansion; after which time a plain, solid arch is used and continued through retention, but with only sufficient spring left in for restraint in retention.

What could be more simple than this adjustment arch? Nothing could be more sure than it in the movements required and I am sure nothing more comfortable from the patient's standpoint, which could possibly produce the results required.

I believe this method of correction will be found so satisfactory, easy to operate and logical that dentists throughout the country will be able to get satisfactory results in its use. There will be no need of making apologies for its appearance or of pacifying the patient in regard to pain from the operation.

Fig. 8 illustrates the typical lower protruding case, with the narrow constricted arch, and an abundance of teeth in torsion occlusion.

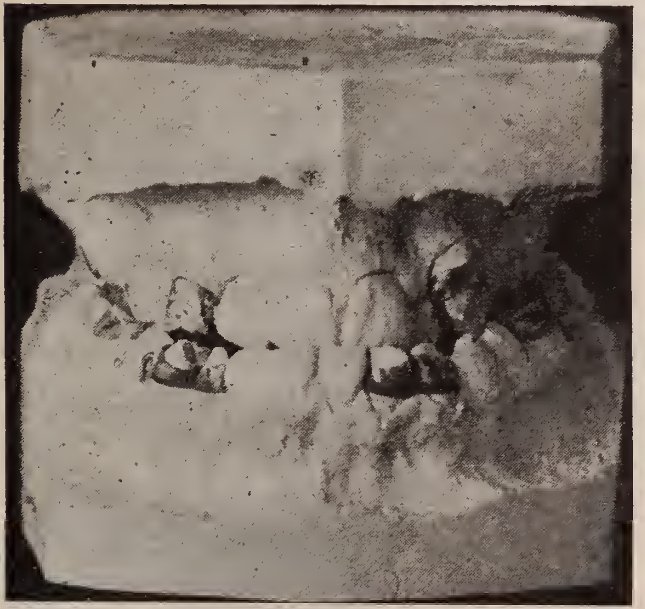


Fig. 8

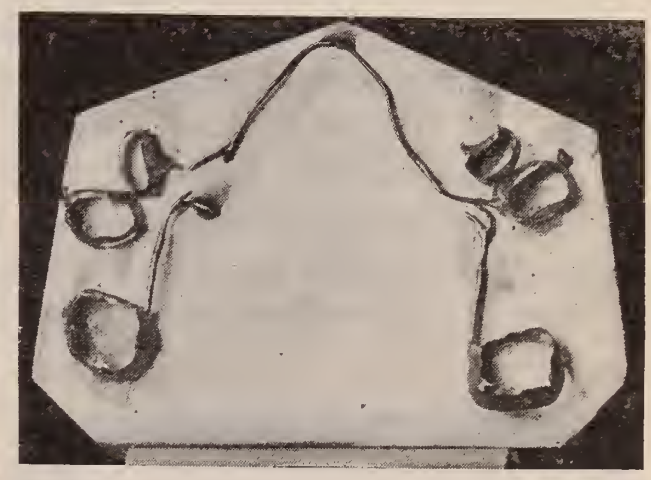


Fig. 10

Fig. 8.—Showing case lower protrusion and full quota of appliance required for correction No one need longer be ashamed of appearance while under treatment for correct occlusion.

Fig. 10.—Appliance torn down for examination. Ends of rods to attach rubbers are slipped in anchor band tubes. These rods may be made longer or shorter and the hook bent against teeth, out of way.

Again I ask you to look at the appearance of this case under correction. It has as neat and clear an appearance as can be. This person would not be ashamed to be seen any place and could not look any better under retention.

The final test with the patient, whether male or female, is based upon looks, with comfort running a close second. In both cases my system of correction is too far ahead even for a comparison with exterior correction.

Length of time needed to correct these cases is so shortened with interior arch correction (due to elimination of wire ligature and all exterior arches and the trappings which connect it) that when thinking of the time needed to correct the ordinary case you would be astounded, for I can expand these arches and shift the occlusion with a rapidity and ease seemingly quite impossible, and though speed in correction is not our primary aim, it follows (on account of the absence of pain and the fact that we are working with nature and not against her) as a logical result.

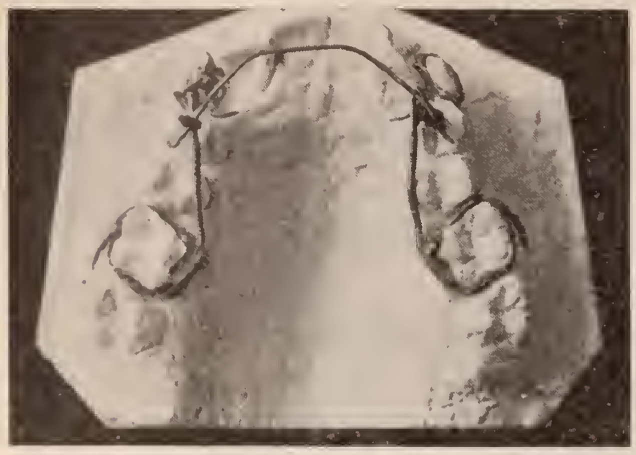


Fig. 9A

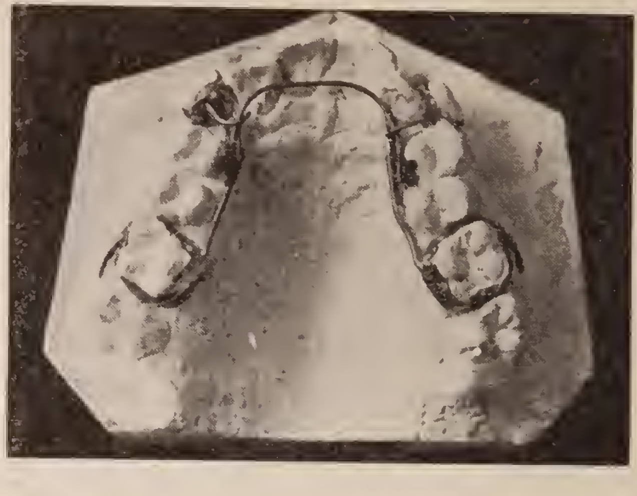


Fig. 9B

Fig. 9A.—Showing upper interior and arch released, which assumes its angival position. Notice the tubes are thrown down and out by bending wire attachment to band; any attachment could now be put in these tubes which would then be moved into position.

Fig. 9B.—Showing upper interior adjustment arch for lateral expansion and anterior movement cuspids used as restraining to hold anterior arch in position.

Figs. 9D and 9C show the same case with the models opened, so the inner surfaces of both arches are visible.

Nowhere will you find a sharp point projecting into the gums, and if there is a roughened or sharp place, the operator is at fault; yet though the exterior arch is removed (gone) and all superfluous bands (called so because

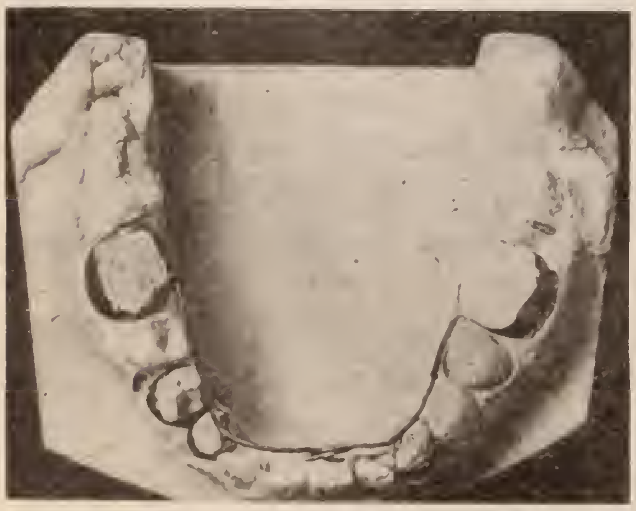


Fig. 9C

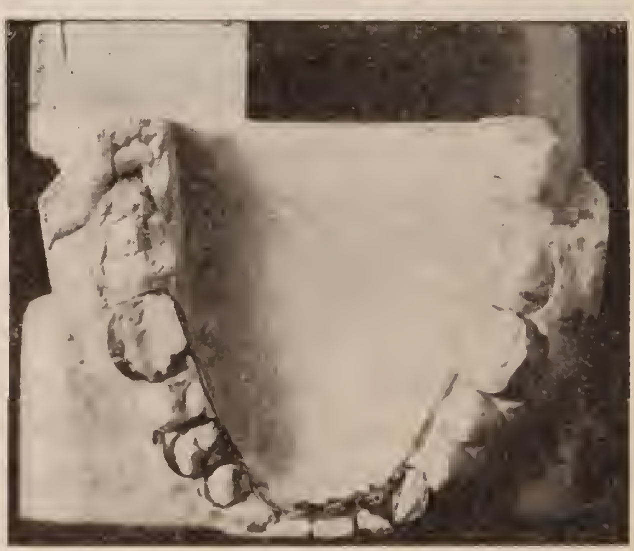


Fig. 9D

Fig. 9C.—Lower, with adjustment arch free from ligature (tension rubber) and anchor tubes turned up, allowing arch to spring outward until ends touch. Showing expansion would be mostly lateral in this instance, though somewhat anterior.

Fig. 9D.—Showing appliance adjusted for greatest lateral movement at position of cuspids. The arch is broken in the center in this case.

I use none practically at all except those for rotation of teeth, which also act to retain inner arch in position—banding each tooth or most of them is a practice as faulty as it is unnecessary), there is not a projection or depth of metal extending into the mouth anywhere near the distance that the *clamp on the anchor band did*, and most of the bulk of appliance is in the anterior position of the mouth in any case, where the room needed for the tongue counts for the least, leaving the posterior teeth smooth; the movements of the tongue are not hampered in any way.

The only portion of this appliance greater in bulk than that required in the case of retainers is the adjustment arch mentioned in illustrations 9 and shown in all the illustrative cuts in this article; but in each case, operating under different conditions, exerting pressure in different ways, these variations exist because of the variation of requirements needed for correction in the different cases, as the arches in the various cases need expansion in the different portions, thus requiring pressure in the portions in different degrees and directions. Yet the method of correction remains the same and the application of the adjustment to the mechanical eye is without question; the demonstration of movement resulting from this method of arch expansion is very gratifying.

Fig. 10 shows the appliances removed from the teeth, showing the amount of appliances used in the correction of a difficult case. The total of appliance used in the correction (exterior), if removed, would show a mass of wire, rods and bands.

The illustrations of the different cases herein shown with appliances on the teeth but with tension removed, shows the direction of applied force under pressure when the appliances are sprung into place. This is multiplied as the pressure from the rubber ligature is applied.

With the adjustment arch it would be easily possible to correct a case without any spring to the appliance whatever, depending entirely upon the rubbers.

This illustration gives a clear idea of the separate parts used and illustrates the rapidity with which changes in appliance and repairs may be made, by the ease with which the appliance may be separated, there being no soldered connections.

All appliance is away from the gums and nothing but that which is secure against loosening as far as any appliance may be, from movements of the tongue, and harm resulting from the pressure of mastication.

In the upper arch, besides general lateral expansion, which is taken care of by the short arch ending in the region between the first bicuspids where the greatest degree of expansion occurs, the laterals and centrals are thrown forward and the pressure against the enamel surfaces turns them into position except that the upper left lateral may require a restraining band. The cuspids are banded that they may act to retain the adjustment arch in position and the pressure applied will also bring them into position.

There are no other bands needed and as the arch enlarges under the force applied by the rubbers, it (the arch) may be lengthened if necessary to require a greater stretching of the rubber.

I would advise all rubbers by the yard, or the little circular rubbers, be purchased of Dr. Canning or from the agencies handling them, as they are especially made for this purpose of tough, pure rubber of remarkable strength. Any other small rubbers I have been able to purchase before will not stand the stretching and retain their elasticity, which not only wastes three-quarters of them but detains the tooth movement by the breakage, the lack of constant tension causing soreness.

You will notice in these cases that the break in the arch (adjustment) is at the point generally where the greatest expansion is necessary, which in this upper model accomplishes the two-fold purpose of expansion and throwing the arch forward.

Lower arch shows adjustment arch in position, using my reinforced anchor band as in all cases; but the arch in this case is overlapped in the center, making the break and force of expansion from just behind the incisor teeth. Expansion from this position also answers the two-fold purpose of usual expansion in the anterior position of the arch, but from the force of the spring of the arch in position, produces a posterior contraction of the arch at point of first molar teeth, the second bicuspids being nearly normal in position.

The spring of the arch inward or lingually and the tension caused by the contraction of the rubber used, forms a pivot area at the point of area located at distal portion of first bicuspid teeth; this area, as occasion demanded, could be moved anteriorly or distally by lengthening the arch or shortening it, whereas if much forward movement is required, the adjustment arch is used as in the upper model, with break in arch and rubber tension at the sides instead of front.

Anteriorly the arch is held in position by the rubber ligatures used in the torsion of the individual teeth. The teeth in a torsal position in the lower arch of this case are the two cuspids, left lateral and right first bicuspid. The rubber for this purpose is secured upon the tooth as described above under "torsion band."

Anchor attachment for the lower arch to secure rubber band to shift occlusion is on band of first bicuspid teeth, which teeth are laced to the arch. Will the force of contraction of these rubbers lift the bicuspids? No, because they are fastened to arch with round rod, or oval if required, which mostly counteracts the tension on these teeth, only giving the roots a possible chance to move outward, so it will not even be necessary to change the tension to another tooth to relieve it.

In case patient objects to the looks of the rubbers, as they show more in some cases, I put the rubbers inside the arch. I submit upon the question of looks we may very well conform to the patient's desires and look at it from this standpoint, as it makes not a whit of difference in the results.

The cases I have shown here and the variations in appliances in applying the principle of my system of correction cover pretty well the entire field of correction (see occlusion of different models shown), and show the system to be flexible as well as practical, comfortable and clean.

There is nothing introduced in the way of appliances here not being applied in my practice; the word "practical" eliminates, banishes the thoughts of high-colored theory not practiced and unappliable.

As to mechanics, I have asked for criticism of the principles of these appliances in regard to the application of force and pressure, from those whose business it is to understand such laws, giving in explanation only the result I desired, and not once have I received an adverse finding. Then upon the request of opinion upon the application in exterior arch correction the finding is always negative as to application of force and pressure, though allowing admission of possible results.

Objections may be raised that these appliances are harder to apply, as they are of special or individual manufacture in each case and time required to make them. I return, the time required in the manufacture at the start is considerable, but very reasonable; but the time has gone by when one should expect to purchase an appliance ready to slip on and proceed to the correction of the case, as with work that may be taken off and dropped at times as desired, as a makeshift, as something which requires no special preparation. That haphazard way must go along with the wire ligature or thread, which are too painful and filthy.

We, as orthodontists, cannot hope to purchase that which we need in our operations in any degree of preparation except lineal measure of band and tube material or tubes soldered onto bands ready to shape, and the ever-important rubber.

The people are getting educated fast in the knowledge that the orthodontist is the expert who is the one fitted to give them the results needed in the manner desired. They are quick in their approval of interior arch correction when it is shown them and as word of mouth is the best medium of communication (whether or not the change to interior arch correction is objected to by the profession at the start as being shockingly different on account of it being more difficult for and harder on the operator until he gets accustomed to it), common knowledge will force the procedure and the creditable results and the way in which they are obtained surely repay us for the extra effort and skill required.

Sixth and Hill Streets.

Notice

The eighteenth annual meeting of the American Society of Orthodontists will be held August 1, 2 and 3, at the Edgewater Beach Hotel, Chicago, Ill. This will be an excellent meeting. It is advisable to make your reservations early.

PREPAREDNESS AND PROGRESS*

BY W. T. MARTIN, D.D.S., BENSON, N. C.

FROM EVERY continent on the globe, from every corner of the civilized world, comes ringing to our ears in one mighty chorus the simultaneous shout—Preparedness.

This watchword, applied to almost every phase of life, was taken up by Germany half a century ago, and the startling consequent efficiency and remarkable progress of that empire have evoked the wonder of the entire world. Her strength lies not simply in her military preparedness, but in her economic and financial preparedness as well.

The same is true of every other nation in the European conflict. The efficiency of each nation in the field of war is measured largely by her industrial, economic, financial and military preparedness before the war began. This demand for preparedness all over the world is simply the consequence of a spirit of unrest among the people—a spirit that always precedes preparedness and progress in any line of human activity.

Unrest among the sailors and merchants of Spain and Portugal was so great that Columbus prepared to find a new route to the Indies, and while attempting this, discovered a new world. The people of France endured the outrages of the nobility and clergy until the spirit of restlessness gripped them, and the French revolution came and produced the great republic of France. The same is true in American history. Every great movement is preceded by a spirit of unrest, and this restlessness is not confined to any one set of people or to any one human interest.

We hear the call for preparedness in every walk of life, and from every quarter where man is interested. Never before was there such an industrial unrest. The right of labor to an increased share in the nation's prosperity resulting from the war, joined with the high cost of living, are declared by labor leaders to form the foundation of the demand of the laborers. Such a universal state of affairs makes us wonder what it all means.

This spirit has not taken hold on man alone, but it has gripped the fair sex. Behold the suffragette in the field!

In every line of human endeavor, man first becomes restless over his unfit condition; then begins to prepare himself for something better. This preparation makes him more efficient, and efficiency leads to progress. A few years ago the immortal Aycock stirred our people into a state of restlessness over our school conditions, and preparation was begun to give our boys and girls a better chance to secure an education. This preparation is still going on, and has led to remarkable efficiency and progress. Man never realizes his ideal, but always is seeking it; so progress generally results from dissatisfaction.

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*Read before the North Carolina State Dental Society, June 28, 1916.

It was this that caused Horace Wells, not content with inflicting additional pain to that he would relieve, to give to the world anesthetics. It relieved the operator and the patient of the worry and dread of the gold filling by the perfection of the cast inlay method. Though we know not to whom full credit is to be given, suffice to say this procedure has itself almost been revolutionized by our own illustrious Charles Alexander.

So in our own noble profession this same spirit of restlessness caught hold something like a quarter of a century ago and has redounded to good along every line of work; it has lifted the profession from an apparent dungeon into a field full of fresh air and sunshine. The world has been greatly benefited and conditions are getting better every day. We no longer have to guess at troubles and diseases of the oral cavity, call them just anything we may, and expect the suffering public to be satisfied with this off-hand guessing; for since we have the bacteriologist, the microscopist, the orthodontist, the X-ray, we can safely say the scientific spirit has taken matters in hand, and is guiding them in the best way and the world is reaping the reward of scientific work well done.

In 1837 unrest caused the beginning of a dental renaissance. The entire development of modern dentistry can be said to date from 1839, when Professor Richard Newton pointed out the organic connection between the vascular and vital soft parts of the frame and the hard substance of the teeth. Then a scientific foundation was laid and dentistry came to be practiced as a specialty of medicine. The sympathetic nervous relationship of the teeth with other parts of the body and the interaction of diseases of the teeth with general pathological conditions were then recognized. Such matters brought about the organization of the dentists, and the year 1840 marked the end of ancient dentistry. Our progress has been rather slow perhaps, but our advance has been certain. We have had to build up a code of ethics, and at the same time drive out the quack and the imposter.

A great confusion of patchwork was done by those supposed to be dentists, and as a consequence the people and the profession suffered. But gradually we are becoming recognized as the people become educated. The American dentist has led, and is still leading, in this advance. People were surprised that in the Russo-Japanese war every Japanese soldier was supplied with a tooth brush and tooth powder, but the American people understood it, even though no military regulation existed for it.

The beginning of modern dentistry in Japan proceeded from America. In England an effort is being made to secure legislation to drive out the unregistered practitioner. It is understood at present that any one can practice dentistry in that country, provided he calls himself by some name other than "dentist." We of America are better protected by law than are those of any other country in the world. This probably is the reason there are more of our profession in the United States than in any other country. In England in 1911 there were 5,000 registered dentists, 16,000 in France, 14,000 in Germany, and 27,000 in the United States. There are more dental colleges in America than in any other two countries combined, and the number of students turned out by these colleges in recent years has been enormous. In the past four years the increase was almost fifty per cent., and yet we do not have too many good dentists.

But the standard of our profession must be raised if we would keep pace with the progress made along other lines and meet the demands that the public will legitimately make of us. Our profession is, and must be, measured by its members, just as a stream of water is found clean or unclean according to the little rivulets that compose it. All are but parts of a stupendous whole. Our profession is calling for better prepared, better educated people. Of course it is important that our children be well educated, that people be protected against adulterated foods; but unless the suffering public is served by a class of dentists whose preparation and equipment are of the best, education and legislative protection will not be of their fullest value.

It was not known formerly that so many diseases resulted from bad teeth and unsanitary conditions of the mouth in general. Our profession, the public in part, and the medical profession, are awakening to the fact that the worst cases of septic gastritis, enteritis, of general ill health, obscure septic fever, and other manifestations of irregularities, result directly from abnormal conditions of the oral cavity; and in some cases from the imperfect work of inefficient or unscrupulous dentists.

The development of crown and bridge work has brought about a renaissance in dentistry so that a thorough training is more than ever necessary to successful practice. Gold fillings, crowns and bridges built in and around diseased teeth form a perfect gold trap of sepsis which, as we all know, may and often does develop into a highly-poisoned condition of the patient. The American dentist must be prepared to avoid such crimes as have heretofore been committed by members of the profession. Our mission is not a general repairing business, but it is to prevent as well as to regulate irregularities of the mouth.

Ninety per cent. of the dental work will be unnecessary, just as ninety per cent. of preventable diseases can be prevented, when the people are educated to the point where they will not wait until unendurable pains force them to the dental office. For then it usually means loss of teeth or an unusual amount of labor on the part of the operator and expense to the patient. People are slowly coming to see the need of taking care of their teeth and to recognize the true worth of the dentist, but it will require yet a good deal of publicity, much persuasion and perhaps in the end legal enforcement to make the thoughtless populace take proper care of one of the most important divisions of the human body—the mouth. At this point, let's voice a protest in which every member of our society safely can concur. We have a State Board of Health composed of excellent men and able physicians, but there is a vacancy on that Board that curtails its efficiency as long as no dentist is included among its members. As much as we have awakened the people, we still have a great work to do, especially along the line of education. This can best be done through such an avenue as the State Board of Health would afford, where we would have the co-operation of the physician.

In orthodontia a great advance has been made. People who say the human race is deteriorating and assert that coming man will be edentulous are disregarded, for a great and beautiful truth has been taught by the orthodontist. People who love truth, goodness and beauty, can see that man, not nature, makes mistakes. Almost every one should possess "laughing pearls of perfect teeth," and some one has said either the man or his parents have sinned if the denture is imperfect and the jaws ill-formed. Regulating the teeth and perfecting a defective denture is where the dentist probably has made his most recent great advance. There is no limit to the possibilities of the ambitious dentist. When Gladstone heard that an invention had been perfected in America whereby a man could converse with another miles away, he said, "Never again will I say a thing is impossible." The propositions came that inquired into the state of the universe; of the shape of the earth; of the character of the human body; the matter of quicker locomotion; of faster communication; and achievement again gave a "death blow" to the impossible in the works of Galileo, Magellan, Edison, Marconi and others. Truly, the impossible of yesterday is the resolution of today and the accomplishment of tomorrow. Who knows but that paralysis and even blindness may yet be attributed to defective teeth?

A cure for pyorrhea alveolaris will yet be perfected. Why not a North Carolina dentist be the man of the hour? May God hasten the day when the dentists of our own great state think more for themselves. The greatest contributions to civilization come from those who are not trammeled by precedent. Let's raise the standard of our profession along every line by taking an inventory of our own preparedness and efficiency in meeting modern demands. In that inventory let's not forget the moral side of the matter, for no man is as well fitted for any work in life as he otherwise would be unless he guards well the morals of his own life.

While a spirit of unrest has awakened the American people to their dangerously unprepared condition, to their inefficient means of protection, to the menace to future progress that hangs over them, let us remember that we, too, must be prepared and become more efficient if we wish to keep pace with the age; we must render more and better service; we must teach the people as well as relieve them.

An ounce of Preparedness is worth a ton of Neutrality. We cannot remain neutral on the subject of education. Ignorance elicits sympathy, not indifference. It is a strong wall against which truth and health dash themselves to pieces, and the wall must be torn down.

"Mental, moral and physical degeneracy follow as certain as fate just as soon as mental, moral and physical advancement stop. It is for those who know, those who are educated, to say humanity shall advance or retrograde. Perfect health depends neither upon pills nor prayers; beautiful bridge work nor a well-made plate; but upon an intelligent following of the rules of correct living. It is the province, and not only the province, but the duty of the professional men of every walk of life to talk to the people, to teach them along correct lines. When a man stops talking he is soon forgotten. Each day a new generation is born, and the same old story must be told again. The world's greatest truths are great largely because of their constant repetition; the story told yesterday must be told today, perhaps differently, nevertheless, told again."

A healthy body is the greatest asset in the world, and it depends upon the air which it breathes and the food it assimilates; both are directly and vitally affected by the conditions existing in the oral cavity. It is not an exaggeration to say that three-fourths of the ills of mankind could be banished if the teeth received the care and attention they require. If this be true, the duty of teaching becomes a tremendous responsibility.

Dental caries is a disease of civilization, and how to check the havoc which it is working on humanity is truly one of the serious problems of the day. There is not a disease to which the body is liable that is not aggravated by a filthy condition of the mouth. Beauty is marred, happiness destroyed and life made harder by the unnecessary and deplorable ignorance concerning the very simple hygienic laws governing the preservation of these important organs. Thousands of dollars are spent by our public schools in an effort to keep the air pure. Strangely, but sadly, school authorities too long overlooked the important fact that the odors issuing from neglected mouths make the problem still harder.

Until recently, with the exception of a very small effort, the dentists of this country have given very little attention to the prevention of maladies of the teeth, devoting most of their time to repairing the injury. This is a disgrace to the profession. It can not be expected that the layman will place proper stress on the pressing need for early attention; the dentist must take the initiative. It is a well-known fact that many mental diseases are the direct result of lack of proper care of the teeth. With no intention to reflect on that which is done—for it is excellent as far as it goes—but would it not be well for us to ascertain whether or not those poor unfortunates of our insane wards, of the state penitentiary, the deaf and dumb, and other state institutions, are cared for in this line as they should be? Just a few men cannot do it.

The Preparedness League of American Dentists is one of the most patriotic movements ever launched. How many of us have pledged our support? Why not out state society "endorse the objects of the League and act in accord with its principles?"

What our Country needs more today than anything else is vigorous, red-blooded leaders—men who will, in their chosen vocation, dare to do, dare to lead. There are only a few educated men in every thousand, and naturally we look to these to take the lead. It is a duty a professional man owes his community to assist in civic, state and national affairs. We need men who stand for something. Edmund Vance Cook expresses the idea forcefully by homely verse:

"Are you a trailer, or are you a trolley?
Are you tagged to a leader through wisdom and folly?
Are you somebody else or you?
Do you vote by the symbol and swallow it 'straight'?
Do you pray by the book, do you pay by the rate?
Do you tie your cravat by the calendar's date?
Do you follow a cue?
Are you a writer, or that which is worded?
Are you a shepherd, or one of the herded?
Which are you, a what or a who?
It sounds well to call yourself 'one of the flock,'
But a sheep is a sheep after all. At the block
You're nothing but mutton, or possibly stock.
Would you flavor a stew?
Are you a being and boss of your soul?
Or are you a mummy to carry a scroll?
Are you somebody else or you?
When you finally pass to the Heavenly wicket
Where Peter, the scrutinous, stands on his picket,
Are you going to give him a blank for a ticket?
Do you think it will do?"

A glorious field of labor already ripe lies before us. Will we enter and reap the golden harvest? The hills of the future are abloom with opportunities. Will we climb to the heights and pluck the flowers? Our country has proved in the past that it has the material out of which statesmen are made; that it has the soil where presidential timber has grown. We have the same sunshine which warmed the hearts of our fathers, and the same blood which was shed on a hundred battlefields. Why should our banner trail? Let us put our shoulders to the wheel of human progress and assist more in freeing the world from ignorance and suffering, thus making our footprints on the sands of time guiding marks for generations yet to come, feeling, believing—yea, knowing—that the real worth of our profession and the true value of our individual lives and work must be measured not by the world's commercial rating, nor by man's censure or praise, but by the disposition we have made of the talents entrusted to our care and the good we have done our fellowman—the service we have rendered humanity.

WHAT'S THE MATTER WITH DENTISTRY?*

BY GEORGE E. BRATTEN, CINCINNATI, OHIO

SEVERAL YEARS AGO, that famous journalist, William Allen White, of the Emporia (Kas.) *Gazette*, wrote his celebrated speech on "What's the Matter With Kansas?" There is nothing the matter with Kansas. The doggerel which says, "The potatoes they grow small in Kansas; they eat them skins and all in Kansas," is a libel on this fair state. We eat our potatoes with beefsteak and gravy, just as they do in the effete East. Don't think for a minute that because a few Kansas congressmen have developed the "lumpy jaw" that we all are growing tails and are running wild with the buffalo.

When your president invited me to read a paper before this society I came to the conclusion that I would take William Allen White's topic, only changing it to "What's the Matter With Dentistry?" I want to say in the beginning that there is nothing the matter with dentistry; it is one of the most noble of the callings and professions on the calendar today, and for the earnest, conscientious and thoroughly well-informed practitioner, one of the most remunerative. We can eat our potatoes, with beefsteak and gravy, just as well as our brothers in the practice of medicine or law; and in passing do immeasurably more good to suffering humanity by keeping the oral cavity in a sanitary condition; for seventy-five per cent. of all human ills originate or are propagated in the mouth where at all times the proper media is held for growth of the different bacteria.

Again I say, there is *nothing* the matter with dentistry. Then, wherein lies the fault that is being so widely heralded through our land by the medical profession, and lately by the laity and public press, for the multitude of "sins of commission" through the medium of bad dental service and restorations? It shall be my purpose tonight in this brief paper to set before you my belief in the reasons for and the causes of all the maledictions being heaped upon our heads.

"By their fruits ye shall know them." This I shall first interpret as being related to the colleges and their course of training. For years I have been of the opinion that private ownership of our colleges should be abolished by law, and in their stead should arise the state-endowed state university for medical and dental training; for are not the state's people entitled to the best professional services that the state can give? Are they not led to believe that when the men and women are graduated from our colleges and the state puts the stamp of approval on them, that these same graduates are wholly competent to treat their ills? True, the private colleges have done a great work in the past; be it far from me to disparage the good work done by such masterly teachers as Brophy, Black, Barrett, Harris and a host of others; but like all other good things, they must give way to the onward march of progress and science. Our state institutions should possess a faculty of trained investigators and teachers, with salaries sufficient so that they shall not be compelled to enter practice in order to earn a competency to maintain them and their families. Then and then only will our graduates receive that to which they are justly entitled.

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*Read before the Mad River Valley Dental Society, Springfield, Ohio, 1917.

The proper instruction of the student either consciously or unconsciously reflects the teaching he has received while at college; few of us rise above it. A college dean once said to me that he could make a good dentist out of most any young man; it simply was a matter of training his fingers. I said to him: "Doctor, I certainly disagree with you. You can't make a silk purse out of a sow's ear." Dentists are like artists—they are born, not made. The make-up of a dentist is a composit of an artist, a scupltor, a surgeon, a salesman, and a gentleman. The scientific advance of the past few years finds us unprepared to grapple with the daily problems of a high-grade dental practice. No field offers an equal chance to a man who knows as does the field of dentistry.

The colleges are too eager for students; the entrance qualifications are quite insufficient; they do not adhere to their present requirements; they seem afraid that they might lose the matriculation fee. I have in mind one student who, upon entrance, was wholly unfit to qualify, and after spending three years, failed to pass his final examination; was required to spend one more year. He finally was given his diploma, not because he had qualified, but simply because they did not want him around any longer! He went before the State Board, failed in nine subjects upon first examination; in the second examination he failed in more subjects than the first trial. I asked the secretary of the Board what really was the cause of his failure, and he told me that he was wholly incompetent and unfit. That same man is practicing dentistry today in Ohio, and did not make any more preparation; he is the same failure today as he was when a student. You can draw your own conclusions. "There is something rotten in Denmark."

This state of affairs would not happen were the colleges under state institution and supervision, for, after the first year, the faculty would know who were fit to continue the study of dentistry, and the unfit would be advised to go into other walks in life, thereby conferring a great boon upon the student as well as upon the public in general. In other words, making it a sort of co-operative course, similar to that which Dean Schneider has in operation in the engineering department in Cincinnati University. We thus would eliminate the unfit in the beginning. I would further supplement this training with six months' preliminary training in a dental office before a student could present himself as a candidate for matriculation. Then the student would know for himself whether he would have at least a liking for the profession. This method would greatly reduce the percentage of those leaving the profession after practicing four or five years, and finding out for themselves that they had made a mistake in the choice of a profession.

"What's the matter with dentistry?" Second: The fault lies with the dentist himself. Gentlemen, I am most heartily ashamed and humiliated when I see the bad dental service that is being rendered the people of our land. Dr. Hunter's charges were only too true. Not *all* of the bad service is being rendered by those without the pale of the dental societies. There is no excuse for any man placing an ill-fitting band upon a broken-down root; no excuse for a mass of filling material to overhang the margin and fill the interproximal space, making for a condition worse than the original cavity; no excuse for making a bad contact point and opening a way for the deadly "meat hole," when we have the means at our command for making the proper restorations. No excuse any more for destroying the pulp and then making no effort whatever to remove contents of canals and filling same, simply trusting that God will take the patient to that eternal home before that infernal root develops an abscess; for be certain "your sins will find you out." The X-ray has revealed our blunders and made them stand out glaringly as "September Morn."

Gentlemen, we should look upon some of our past efforts with shame, and right here and now make a firm resolution with ourselves hereafter to perform each operation a little better than we did it before. In the treatment I would say to the younger men, and I guess it would fit us older men as well, take a few extracted teeth, place them in a plaster model, open into the root canals, cleanse, treat and fill them just as you would were they in the human mouth. Then file these roots down until your root filling is exposed, and then determine how well you have earned your fee. You will be surprised at how many times you owe your patients instead of them owing you a fee. It is said that a "laborer is worthy of his hire;" then make your services worthy of your fee. Make service your main object, and not the dollar, for it is my firm belief that if high-class service is rendered, the dollars will be won easily.

Unscrupulous methods of practice never will hold your clientele. Abraham Lincoln's saying, "You can fool all the people some of the time and some of the people all of the time, but you can't fool *all* the people *all* the time," aptly applies to the practice of dentistry. You may imagine that your patients never will know what you have covered up and concealed in their mouths, but be not deceived; like murder, "it will out," and as "chickens come home to roost," so will those defects come home to you, highly magnified, and your star patient, the rich Mrs. Jones, will become the patient of the thoroughly painstaking and conscientious Dr. Blank; not because she wanted to quit you, but she has found out that you did not have her best interests and health at heart but that your sole object was to get her money. You had followed the advice of the old Quaker to his son: "My son, get thee money; get thee it honestly if thee can, but *get* money."

Dr. Belcher, editor of *Oral Hygiene*, says that we are a profession half educated, poorly prepared and lacking in scientific training. So long as we were called upon to perform things mechanical all was well; but in the twinkle of an eye all of this is changed. Biff! Bang! Did you hear the explosion? Suddenly the dentist instead of being the repair man and doing the rough dry-cleaning of the human anatomy is elected chief guardian of the gate. The mouth and its associate parts are recognized as an essential to life and health. The dentists of today must know anatomy, physiology, pathology, chemistry, microscopy, radiography, bacteriology—and know them well. How many of us were prepared by previous educational training? The medical profession has rid itself of "heart failure," "malaria" and numerous other "isms;" thrown its medical discards to the dentist and asks *him* to shoulder the burden of medical mistakes and inefficiency that persists in remaining above ground. Every thing that cannot be accounted for is ascribed to the mouth and teeth.

Personally, I don't believe that every tooth at whose apex the X-ray reveals an abscess is a menace and should be extracted, as our medical brothers would have you believe. I have in my office right now an X-ray photograph of an upper left lateral and cuspid, which had a well-developed abscess at the end of each. Two years ago I was called upon to treat those teeth, which I did, and filled the canals to the best of my ability. Four months ago this same patient had cause to be treated for a condition which, to his physician, seemed obscure. He saw those two darkened teeth and at once came to the conclusion that there was the certain "foci of infection." An X-ray was ordered, and lo and behold! He found nothing—all tissue was as clean as a hound's tooth and those root canals were perfectly filled. The physician's diagnosis needed revising, and after doing so the patient made a complete recovery.

I shall say but little in passing in regard to fees, for that is a subject that has been hashed and rehashed before our societies and in the journals for years; but I am of the opinion that as a rule we usually are pretty well paid for the kind of service that we render. Not all of us are getting all we deserve, but a good many are getting more than they deserve. I shall leave that to each dentist as an individual proposition. Let us take a retrospective view of our past achievements and settle the question for ourselves whether we would have considered the fee we received as sufficient for the kind of service we rendered our patients had that same service been rendered to us. I claim that a patient cannot pay too well for a dental service properly performed, but a poor dental service is expensive, no matter how low the fee. Not all so-called "high-class" operators are earning their fees, not by a "long shot." Some of the most abominable operations I ever have known were performed by one who received the highest fees in our state, who was regarded by his patients as a wonderful dentist, who destroyed pulps ruthlessly, placed large fillings and crowns without ever making the slightest attempt to fill the canals. I thank God that all are not so unscrupulous. We have lots of honest, conscientious and hard-working men in our profession; but we need more. The X-ray is the great "Bertillion system" that is showing to the world our incompetency.

Gentlemen, it is not too late for us to mend our ways. Let us take a firm hold upon ourselves, lift up our heads, throw out our chests, pull up our belt straps another hole and march forward to greater achievements than ever before; and when we have passed, the world will say of us, "They have fought a good fight; they have kept the faith; they have safe-guarded our health and made the world a better place in which to live." In closing I would say with Burns:

"Oh, wad some power the giftie gie us,
To see oursel's as others see us;
It wad frae monie a blunder free us,
And foolish notion."

SHALL THE INDIANA STATE SOCIETY CUT OFF EXHIBITS?

A QUESTION FOR THE EARNEST CONSIDERATION OF EVERY MEMBER

BY F. E. GRAFFT, D.D.S., WABASH, IND.
PRESIDENT OF THE WABASH DENTAL SOCIETY

THERE HAS BEEN so much missionary work and favorable talk by a certain element in our Indiana State Dental organization relative to the increase of our annual dues to $10.00 per member, that I desire to call attention to it in the hope that every member of our organization who is entitled to express himself and his individual views on the matter will give the subject what it deserves—serious consideration.

Let it be thoroughly understood in the beginning that I am not opposed to the proposition, if the majority of the members of our state association favor it. I am, however, inclined to question the saneness of some of the arguments that are afloat in favor of it, especially the argument that with this increased dues we will be able to institute and conduct a post-graduate course, instead of having the usual programs as we have been having heretofore.

Every member should know that it is not possible to give to any organization that has as large a membership as our Indiana State Dental Association a practical post-graduate course, especially in the length of time allotted to our state meetings. We have nearly 1100 members, and our state meeting consumes from two to four days, with an attendance last year of nearly 700 members; and how any class of men may hope to give such a large number as this a practical post-graduate course in the length of time permitted is to my mind impossible and unthinkable.

Some also argue that by increasing the dues they will be enabled to do away with the dealers' and manufacturers' exhibits, as well as the income or revenue we receive from these exhibitions. I desire to raise the question: Do we really want to do this? Those of you who have been attending our state meetings with any regularity have witnessed time and time again some one or two men out in the halls with a megaphone hollering themselves hoarse in an effort to get the members out of the exhibitors' rooms into the assembly hall to hear the program. This is a condition that has confronted every state meeting that we have held for a number of years. Of course, if these exhibits are prohibited, the use of the megaphone will be unnecessary.

There is a good reason for this condition, but it is not due to the fact that we have not enough money. If we had an inexhaustible bank account it would not correct the tendency and desire of these members to remain with the exhibitors instead of meeting in the assembly hall for the program.

These members remain with the exhibitors simply because the exhibitors' representatives are presenting things that the members are interested in, and the representatives present it in such a manner that the member is able to digest and utilize it. Whereas, it often happens that if he went into the assembly hall he would be obliged to listen to a paper or discourse delivered by a man of little or no experience, or a man of only mediocre ability, who perhaps has spent much time and study on his subject and presents it by the use of many technical terms which he has temporarily mastered for the occasion, or he may hear some specialist give an elaborate thesis on his speciality instead of a practical presentation of the subject so it could be appreciated and utilized by a member doing general practice.

Our members come to our state meetings with but one object in view, and that is to improve their efficiency. They expect to secure in one way or another knowledge, practical knowledge, which will enable them to do better dentistry. This I am sure is the ambition and desire of nearly every member in attendance, and the mere fact that we have experienced some little difficulty in getting them to leave the exhibitors' rooms and come into the assembly hall is not sufficient ground upon which to hold the exhibitors responsible. Instead, I would suggest that we give more serious consideration and thought to our programs.

I do not wish to have this statement construed as a criticism upon our programs, or upon our men who have been arranging them, because I veritably believe that they have done the best that they could possibly do, and have provided as good a program as could have been provided under the circumstances. However, I am sure that if our programs were arranged and planned with the idea of giving to the majority of the membership practical knowledge, there would be better attendance. We would not need the megaphone to get our members into the assembly hall.

As said before, our members come to the meetings in the hope of acquiring practical knowledge, and they secure this knowledge from two sources, namely: the program proper and the exhibitors' displays and talks. Here we have competition, pure and simple. Members should be at liberty to choose which one of these sources they utilize in trying to secure the knowledge which they desire.

Personally, I do not believe it wise for us to think seriously of excluding the exhibitors for three reasons:

First: These exhibits are a source of education to many of our members. They acquire much practical and beneficial knowledge from them and from the men who, by the way, usually are masters of their subjects, and have a peculiar and pleasant method of presenting them in a practical way.

Second: The exhibitors and the dentists are so interdependent. Their interests are so common that you cannot afford to divorce them; and if they are divorced under pressure, there is but one alternative, as expressed by one of our largest and best dealers, "they would be compelled to institute and hold from four to eight dealers' conventions in the large cities somewhere between the Atlantic and the Pacific coasts." For a dentist located in a large city this will be no exceptional hardship, for no doubt one of these exhibits would be held in each large city. He would be able to attend our state meetings, which nearly always occur in the large city, and the exhibitors' meeting with little or no sacrifice; but what about the man who is not fortunate enough to be practicing in one of these large cities where these dealers' and manufacturers' conventions will be held? He would be compelled to make two trips to a city and attend two meetings with all the expense and time doubled, and in this day of conservation that would be a serious mistake and hardship. The average dentist is compelled to conserve his time and money in order to meet the unusual exigencies and fixed expenditures of the day. A great many of them would forego one or the other of these meetings. This is inevitable. Either your state programs are going to lose in number of men attending or your dealers' meetings will lose, and from a very close and careful study of the situation for a number of years, I am inclined to think that your state program will suffer the greater loss.

Third: Another reason why I question such argument when closely considered, with this interdependent relation between the dealer and the dentist and the necessity for close, hearty co-operation instead of a divorced relationship borne in mind, is the debt of gratitude which we as a profession owe to the dealers and manufacturers. We all know that it has been their contributions and support, and to a marked degree their benevolence that has enabled us to accomplish many things and to grow and develop to our present standard and strength. It does seem that it would be exceedingly ungrateful for us the moment we are apparently able to stand alone to prohibit the exhibits of the men who have so freely and charitably helped us to reach our present condition.

My acquaintance and observation has led me to believe that the average dealer and manufacturer is no different from any other class of human beings. They are business men who are looking after their own interests, trying to procure an honest livelihood by the sale of their products. Being shrewd, they appreciate and realize fully the necessity of helping the men who are going to pay them for their products; and it has been this dependable charity on the part of the dealers and manufacturers that has helped us to safely tide over many a rough and stormy sea; and I insist, as our future progress is before many of us, and entirely before us as a profession, that we should realize and appreciate the interdependence of the dealer and the dentist, and encourage a warmer feeling between the two, rather than take any steps that would divorce our common and interdependent relationship.

If the dealer and manufacturer is willing to incur the expense of his exhibit and compensate a capable representative for giving out to the members in attendance, knowledge, practical knowledge, it would be a serious mistake to deprive these members of that source of knowledge.

If the dealer and manufacturer, in their breadth of wisdom and shrewdness, or foresight and business instinct, realize that my success means increased volume of business to them, should we object? If the volume of business I am doing, when measured in dollars, equals $5,000 annually, am I not worth more to my dealer than if the volume of my business were only $1,000 annually? This is a simple mathematical proposition and cannot be denied. Dealers and manufacturers appreciate this; hence they are intensely solicitous for our success and ever ready to assist us in efficiency.

The dealer and manufacturer have, no doubt, taken this into consideration so that he takes much pride and frequently incurs a very heavy expense in order to aid us so that we in turn may, through his suggestion, increase the volume of our business which aids him to a proportionate increase. Their success or prosperity is largely dependent upon ours. Our success is largely dependent upon theirs, as our progress in the past has depended very largely upon the initiative and the inventive genius of the manufacturers, who have led in the forward march.

They are quick to aid or assist us as a profession or as individuals. You may call it charity if you choose. It matters not what term you apply to it. Charity consists of doing a thing for which we do not expect to receive in return any reward. Hence, I would say it is not charity, but shrewd and well-founded business instinct, because they realize and appreciate this interdependent relation which we should not think seriously of divorcing, but should be just as ready to encourage and take advantage of as the dealer and manufacturer.

It is a poor rule, indeed, that does not work well both ways. If your dealer is prosperous, carries a good and up-to-date supply of manufactured products, is not this to your advantage; does not this enable you to do more and better dentistry? Does not this help you to keep abreast with the new and good things; and by the use of these new and good things, are you not more proficient? Can you not increase the volume and standard of your business by discriminate use of the new and good things?

The mere fact that we have from time to time encountered a little difficulty and required the use of a megaphone and inflicted a few strained vocal cords in an effort to get some of our members away from these exhibits, is to my mind the best proof possible that we need these exhibitors at our meetings. They are beneficial to many of our members. They are one source of knowledge, and if we abolish them, we surely will loose this source of knowledge which in the past has proven to be of very great interest and benefit to many of the members.

There are many of our members who feel that if our dues are to be increased to $10.00 per year, that the greater part of these dues should remain in the treasury of the local society; for by so doing, it would improve the efficiency of a greater number of men. Nearly every man will attend his local meetings and there are so many more sessions of our local or component societies that it is reasonable to expect the most good to the greater number of dentists would be done if the largest part of our annual dues should be expended in our local societies.

There also are many of our members who feel that any legal dental practitioner of good moral character who shall subscribe to the code of ethics should be admitted to membership of the local society having jurisdiction over his locality, without being compelled to join or contribute financially to the state or national societies. There are dentists in all localities who will not pay the membership fee and dues required for membership in the state and national associations, but who would willingly pay a nominal membership fee and dues for the privileges of membership in his local or district society. If this were provided for or made possible, it would help meet the expenses of local societies, bring such men into friendly contact with their professional neighbors, obligate them to an increased spirit of fraternalism and make of them better citizens and better dentists.

My last suggestion that I wish to make for your serious consideration is that it behooves us all to forget our own pleasures and ambitions and be willing to make sacrifices for the benefit of the other fellow. This is really the spirit of our nation. This is the thing in life that makes life worth while; so let us turn this thing over in our mind seriously before we take our plunge, because once we are in, the water may be colder and deeper than we supposed, and let us hope that any action which we may take will be such that there will be no need of our friends or enemies to sing, for our benefit, that popular little ditty: "Don't Bite the Hand That is Feeding You."

You can invariably trust the judgment and action of the majority in any American organization, providing the majority are given an opportunity to act and render the judgment; and it is not delegated to a few selfish, presumptuous and mediocre men with an invisible organization behind them.

ROOT-CANAL THERAPEUTICS, SANE AND INSANE*

BY W. G. EBERSOLE, M.D., D.D.S.

ROOT-CANAL TREATMENT AND FILLING WITH THE FRILLS AND FURBELOWS ELIMINATED

(Continued from page 269, April number.)

DISCUSSIONS

Dr. Neff: I congratulate ourselves that this important and much dis-*cussed* field of dental operation is clearly outlined by our collaborator. We are fortunate in having a feasible plan of standardization worked out by a dentist of such long professional experience and such varied physical experiences in his own life as he has so unselfishly recounted to us tonight. Whether or not we as an organization shall take such action now, I shall in my young life look forward hopefully to the time when this much-buffeted subject will be settled satisfactorily. I shall do all I can toward the adopting of some such general plan as our essayist has outlined tonight. In spite of the numerous conditions presenting in this trying work, I believe there are not so many different classes of cases but that they can be classified before I grow old.

Dr. Henry Barnes: Dr. Ebersole is the Teddy Roosevelt of the dental profession and like Teddy he has many good friends, and some mighty dear (?) enemies.

We may believe Dr. Ebersole is a little verbose in his papers, but this is a quality which belongs to his personality and he cannot help it. However, he presents to us many strong phases epigrammatic in character—"Give nature and the patient a square deal" is one of these and he is quite correct when he says, "we have not given nature and the patient a square deal". This is not altogether our fault for we have been taught such a holy regard for precedent and the profession, and the Lord knows when the question is simmered down to actual knowledge the professor knows quite as little as do we. What we demand from our scientific investigators is a plain statement backed up by incontrovertible fact. In the result of my special work in mouth cleansing during the past seven years, I have been more than ever profoundly impressed with the wonderfully recuperative power there is in nature when we stop interference and give her a chance. You might just as well put obstructions upon the track, then start the engine at Cleveland and expect it to reach Chicago, as to look for success doing the things we have done and are still doing in many cases. Faulty diagnosis and prognosis are intimated in this paper. Two illustrations of cases which have passed into history are here noted. Within the past two years before this society, and in this room there was thrown upon the screen the picture of the head of a dog; arsenious acid had been applied to the pulp of one tooth and there was a lesion upon the tongue. The statement was made that the lesion was produced by the acid being taken up through the circulation. Looking at the picture, the lesion was at the surface upon the tongue, which would cover this treated tooth as the dog lolled his tongue and the mechanical irritation thus produced would account for the lesion at this point, or the tongue was poisoned by some of the acid left upon the tooth or both. In the absence of scientific proof to the contrary, this is the simple logical explanation of the lesion at this point. So much for diagnosis.

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*Read before the Cleveland Dental Society, February 4, 1918.

Prognosis: Several years since a patient was referred to an X-ray specialist. The picture was returned to the patient, also a letter which was substantially as follows: "Your case can be treated and cured, and any good dentist should be able to treat and cure it." The case, a right lower molar, had been .pronounced hopeless, but to satisfy the patient the picture was suggested. The patient was not cleanly about the mouth and also was in poor health. The tooth sagged in its socket like your feet in rubber boots when you have gone in over the top. The tooth was extracted and there was only a small attachment upon the mesial surface—about three thirty-seconds of an inch in circumference. Aside from this the roots were covered with small round vitreous concretions, and the original socket was entirely gone. An absolutely hopeless case. I desire to caution the young men to be very careful of your promises as to cure. You may believe a cure is possible, but you do not know, and therefore you have not the right to make a definite promise. It is not my purpose to discuss Dr. Ebersole's technic, but the pictures thrown upon the screen accompanied by their history show some mighty fine work, and few of us are able to equal it.

Another statement in the paper is worthy of our careful consideration. He intimates that his first ten years' work with the profession was a failure. His work with the profession and the influence upon the laity through his Oral Hygenic Campaign built the substructure upon which was later constructed the superstructure, the National Scientific Foundation, for had this work not been done it would not have been possible to have so successfully launched this great work. Assemble the known facts, think it out for yourself, and then give him the credit due.

Dr. Geo. E. Bishop: Dr. Ebersole has worked out a constructive proposition from his own standpoint, and the one lesson particularly that I get from it is this: It is up to each one of us to work out a constructive method of root filling and technic. The main point is to get as good results as he evidently gets as shown from pictures on the screen. I think that we should give Dr. Ebersole a vote of thanks and commendation for the paper this evening.

Dr. W. A. Price: I would say that I believe that Dr. Ebersole has said, more truthfully than he has realized in his paper and has demonstrated very truthfully, that nature deserves more credit than we have been willing to give her, and the results of the work at the Research Institute are that we as members of the dental profession, are taking and have been taking too much credit for the work we are doing, and not giving nature enough credit. Nature has often been accomplishing wha she has in spite of us, rather than because of us. And, when his suggested technic shall be tried out, I am afraid he will again have demonstrated that some of his splendid results are because of the tolerance of nature rather than because of the helpfulness he has been to nature. My criticism of his paper would be that it is to teleological; he has magnified it with words instead of with evidence. If his paper is to become a part of the constructive work of dental practice, it will be so because he has furnished new material, new evidence on which we shall build a theory and a practice. And I will ask Dr. Ebersole to answer in his closing discussion, some of these questions which are not clear to me: What evidence has he that nature can take care of the tissues beyond the apex when the tooth has been infected throughout the canal, including the cementum at the apex? I think we will find, when we get the facts, that those teeth are tolerated by nature in spite of the fact that there is still infection about the apex; he has assumed that if we fill them perfectly, nature will take care of everything beyond the apex. Is that dead cememtum not always infected cementum? Therefore, I say nature has tolerated that infection and his statement that nature will take care of it, in my judgment, is not an answer to the question at all. Again, he presumes that those canals which nature can force a stream of blood through can be cleansed and can be filled, and I would like to ask him what evidence he has that by any form of pressure he can remove the fragments of tissues from those canals? It has been suggested that all he can get by suction is fifteen pounds to the square inch; now, if he will use his pressure in the reverse direction he must force that through into the vital tissues. What evidence has he that chloro percha will fill those canals after the chloroform is out of it? Our evidence is that chloro percha occupies 260% more space than it will have after the chloroform is all gone out of it. Now, granted that he has been able to force his chloro percha through and get the chloroform out to a point that it still has enough chloroform to make a dent in it, I maintain that it will not have its final size by half. Again, we have presented to us the proposition of using a material in the root canal to setrilize, with the assumption that it will sterilize, I would like to know what evidence the essayist will furnish us that sodium will sterilize the dental tubuli? We have evidence that when treated just as he suggested, the tubuli still are infected. I maintain then, until we have further evidence, that the dentin is still an infected structure. Again, he suggested using this caustic in the root canal and working it to the apex with the idea of sterilizing and removing the infection, but we must not get it through the apex. How are you going to use a material that is so violent without getting it through the apex?

Again, he has suggested that if there is still moisture at the apex he will use trichloracetic acid to take care of the moisture coming through the apex What evidence has he that trichloracetic acid will not destroy the vitality of the peridental membrane about the apex? What evidence that dead cementum will not become an infected cementum? If I were to have the choice I would rather you use some germs of my own mouth than to force trichloracetic acid because my body has a mechanism that will kill the germs infinitely more easily than she will repair cementum. Nature cannot send her forces into that dead cementum and destroy the bacteria. I also would be glad if our essayist would suggest to us how he is going to remove a root-filling material from the root of a tooth and, know that he is not pushing that root-filling material through the apex? And again, I would like to have our essayist suggest to us how he would demonstrate to his own satisfaction and how to ours that when he incapsulates the end of the root of a tooth with chloro percha that it actually is sterilized, or even mechanically closed? Various operators have found that when they have extracted a tooth that had this wonderful umbrella-shaped mass over the apex of the tooth, it did not come away with the tooth, but remained. I would be glad if he will explain to us why toxins or anaphlotoxins will not be formed in teeth filled by his method as deadly as with other methods, and as readily get into the system? Then again, referring to his own case, I did not understand clearly how he would have us differentiate, what the difference would be between one tooth of his and the others, and whether it would not have been infinitely better that he had had them al extracted long ago than to have suffered as he has suffered.

Dr. Acker: I would just like to remark that Dr. Price has spoiled it all—we don't know any more than we did before. But the point that I want to bring out is that we are not yet ready for endorsing a standardized method of root-canal treatment. Our Research Institute has got to work some years before the profession can think of adopting such measures. The essayist put some excellent work into that paper, but I believe I could have said all he said in ten minutes. It simply was trying to do thoroughly what most of us have been trying to do for the last twenty years. In regard to going beyond the end of the root, I would rather agree with Dr. Owens and not go beyond the end. In regard to that part where he said: "if he had an instrument broken off that the tooth would have to be sacrificed," I have had such cases and I have taken an X-ray, located the broach, and sealed in tincture of iodin to rust that broach so it could be removed.

Dr. V. Barnes: I understood that Dr. Ebersole followed the Callahan method, using rosin dissolved in chloroform to seal the tubuli and the dental canals. In so doing he eliminated the greatest source of infection and relies upon nature for the elimination of that small amount of infection which cannot be readily removed by mechanical or chemical means. This seems to be a rational procedure since, after all, healing takes place only when the antigens become active enough to overcome infection. Our problem seems to be to find out how much we must help nature and to what varying extent we should rely upon natural processes of elimination. The opposition to a standardization of method seems to suggest that some of us fear that such methods would show up our work, whereas it should certainly help us to find out whether our work or the method was at fault when success did not follow.

Dr. Pond. It is pretty late for a stranger to start in. A thought of mine during the reading of Dr. Ebersole's paper was that the comlpexity of the subject selected is so great that the average listener will be taxed to his utmost to gain much of help at the present time. I am interested, however, in the point of view that was undercurrent in the paper—the reliance upon the forces of nature in combating infection. Probably you who have heard me before know that there is in the foreground of my own work the desire to find out the offensive and defensive forces of the human body, and as well, those of the bacteria and other infecting agents in the body, in the terms of physics, chemistry and physiology, and the desire to put before you in different ways what those forces are. It is significant at the present time that the normal infecting agents of the tooth and supporting tissues you do not yet know, nor has any one studied toward that end under sufficiently exact conditions, and less do you know the efficiency of the methods recommended to combat root canal or periapical infections which you have been hearing about tonight,—let alone the more difficult estimation of the forces of human nature to be relied upon in sterilization. There are some important tasks that are being undertaken at the Research Institute and at other places which will throw light upon the general problem of root-canal therapeutics. The investigators are not trying to cover a great large class of tasks in a superficial manner but are endeavoring to separate a great problem, such as has been brought to your attention tonight, into smaller parts and to try to understand the conditions which prevail in and about the root canals. When we know these conditions in more or less exact terms, we may better advocate standardized methods of treatment for combating the foes of the human body.

Dr. Ebersole (closing): I want to thank you very much for the leniency shown in the discussion of my paper. I regret that the volume of war business coming before the society delayed the reading of my paper from 7:30 to 9:30, and that the hour now is so late that I cannot attempt to analyze the deluge of camouflage that Dr. Price has just used in an effort to cover up or destroy the influence that my paper is intended to wield upon the members of the profession. I will say, however, that there is not a phase of the subject he presented that I have not given due consideration, and I believe that if the time was afforded, I would be able to answer most of the questions propounded in a manner, while not acceptable to Dr. Price and some of his associates, would show to the profession in general that my solutions of the problems he raises are in harmony with the activities of nature. I did not say that we could sterilize—in fact, I explicitly stated that I did not believe it possible to sterilize the tissue beyond the end of the roots. The fact is that I condemned the efforts that are being advocated in this direction as outrageous and wish to reiterate in the most forceful manner my condemnation of the efforts that are being put forward in this direction. I did not say that the root-canal filling employed, thoroughly sealed the canal ends. I did say, however, that I thought that the incapsulating part of the root-canal filling acted in the capacity of a valve in sealing the end of the root, and was a safer and saner proposition than an attempt to fill the root without passing a portion of the filling through and into contact with the soft tissue. He raises the question of inability to sterilize the dental tubules, stating that we have evidence when treated just as I suggested that the tubules are still infected. In the first place, I do not believe that he or anyone else has ever employed the technic just as I described it and use it in my practice. Many men are using sodium potassium, sulphuric acid and the other preparations that I described, but nowhere have I heard of anybody using them just in the manner I described, and I would ask Dr. Price to study that technic before he makes a broad assertion that he finds the tubules still infected when they have been treated in the manner which I have suggested. But grant that there remain a few micro-organisms in the tubules after I have made every effort to destroy them, for he must see if he followed my line of procedure that I have sealed the dental tubules by the use of rosin, entombing, as it were, any micro-organic life that might remain in the tubules, and Dr. Varney Barnes covered this point very nicely. If the work of Dr. John R. Callahan counts for anything, I do not think that we need give the micro-organisms that remain in the dental tubules any further consideration.

As to filling the root-canal ends, I wish to say that in the technic offered tonight I have not used chloro percha as a root-canal filling. Dr. Price's discussion of the shrinkage of chloro percha may mislead some into the belief that Dr. Price treated as an actuality things which I presented only as a possibility—in other words, the only place that I discussed chloro percha as a root-canal filling was as a possibility under high pressure in filling the so-called "impossible" root canals which was purely a tentative, a part of my paper. In the technic offered tonight chloro percha is used only as a lubricant in order that solid gutta-percha points may be passed into the canals under sufficient pressure to eliminate all excess chloro percha. It is for this reason that we use numerous points and continue the packing under heavy pressure.

The point I want to make and that I want to fix in the minds of every individual present is that the human organism is thoroughly capable of handling and destroying micro-organic life which enters the human body if she is not unduly handicapped; that is part of her mission in life. It is our duty as dentists to eliminate the cess pools at the ends of pulpless teeth and give nature an opportunity to perform her function, which is to take care of the pathogenic bacterial life found anywhere in the body. Dr. Price wants to know what evidence I have that nature will take care of the tissue beyond the apex of infected teeth that have been thoroughly filled as I described. My answer is, the best that the world affords, both clinically and radiographically; clinically in the relief from both local and general distresses and in the immediate improvement in the general physical condition of the patient, following treatment. Radiographically we have to submit the proof that there has been a readjustment and reconstruction of the tissue at the end of such roots—that it so closely approaches the normal condition found around the roots containing vital pulps that it is impossible to distinguish any point of irritation or rarefaction as far as the radiograph shows. Several of the slides presented tonight demonstrate this fact. When it comes to showing proof I will say I might have shown case after case and slide after slide, because the statements I have made here tonight are not made on the result of a few cases, but are based on the experience obtained in many cases. He asks how I am going to take care of the cementum at the end of the roots and asks: "Is not dead cementum always infected cementum?" Yes, but infected cementum is not always dead cementum. So long as the pericemental membrane has not been completely destroyed over any portion of the root, there always is a possibility of saving the tooth, provided the root can be successfully filled. If then, the peridental membrane has been completely destroyed over any portion of the root, I do not believe that that root should be retained in the mouth. He condemns my use of trichloracetic acid, expressing fear that I will destroy the peridental membrane about the apex of the root. I do not use it by the quart, doctor—I simply use a small portion of it on a broach with cotton, and carry it to the end. It is self-limiting in effect and is readily neutralized by the tissues, and if used intelligently, there absolutely is no danger to the peridental membrane. He is very much afraid of trichloracetic acid and its influence beyond the apex of the root, but he has stood on the platform and advocated attempting to destroy the bacteria in the tissue about the apices of the teeth, when he is aware that there is no known substance in existence that will destroy micro-organic life in the human tissue without inflicting far greater damage to the infected tissue than it does to the infection. Nature walls off and protects the body against infections as far as possible, and up to a certain point is able to handle infections without assistance. In other words, she builds up walls around irritating tissue in an effort to imprison and strangulate the activities of pathogenic micro-organic life, or to protect the body from irritation and a great many areas of rarefaction shown around the roots of teeth by the radiograph are a protection and not a menace as most people seem to think, and the sooner we come to know this the better, and I have been surprised that our research workers have not mentioned this. It is true, however, that where these areas of rarefaction are found that it is an indication that nature is being disturbed in this locality and that she needs help to overcome the irritation. But as I said before, many of them are a protection and not a menace, and our research workers should so recognize them. I might go a step further and say that some of the things that are being presented as facts from the Research Institute are statements that are going to have to be retracted as they have had to retract other things. If I have done nothing else by the presenting of this paper than to win from Dr. Price a statement that we must give nature credit for doing something, my efforts shall be well worth while, for up to tonight I never have heard him give nature credit for being able to successfully handle irritation and infection. He calls it tolerance—he says that I have stated more truthfully than I realize and demonstrated better than I know; that nature deserves more credit than we have been willing to give her. I wish to challenge that statement by saying that I am not willing that he shall measure my broadness of vision or truthfulness by his or some of his associates, if we are to judge by some of the things coming from the Research Institute, nor am I willing to have him include me in the "we" when he speaks of how much credit we have been willing to give nature; nor am I willing to have him include the general profession in that "we." If by that "we" he means Dr. Price and some of his associates, I withdraw my challenge. He says he is afraid I will find that some of my splendid results are because of the tolerance of nature, rather than the helpfulness I have been to nature. Why, bless his soul! it was only because I recognized nature's tolerance and because of my knowledge of the helpfulness of the work that I and others have been doing that I dared present this paper at such a critical time—a time when the morale of the dental profession has been "shot" to pieces over the destructive educational propaganda that the Research Institute has been putting out during the last four or five years relative to root-canal therapy. Let me go a step further and say to you that it was only because of the great injustice that was being done to humanity in general by this long-continued destructive educational propaganda that this paper was written. I call it destructive educational propaganda because through it the confidence of the dental and medical professions and even the people themselves has been so destroyed that millions of valuable teeth have been sacrificed. In the beginning and for some time after, this destructive educational propaganda was an absolute necessity in awakening the dental and medical professions to the influence that faulty dentistry exerted upon the health, and the propaganda met with my unqualified approval and hearty support; but when after five years of this kind of proceedings and the spending of thousands and thousands of the dental profession's money, and when the dental and medical professions and the people as well were without confidence in the dentist's ability to treat and fill any pulpless tooth in a manner that is acceptable to nature, I felt that it was high time that someone call a halt and demand that from now on a constructive propaganda be employed. The morale of the profession must be improved to a point where it is able to recognize the tolerance of nature, and the ability of nature to handle and overcome many physical handicaps, and my paper has been presented with these two objects in view. The first was to restore the confidence of the dental profession in their ability to do something worth while in the way of root-canal therapeutics, the second was to call attention of the research workers to the now damaging effect of their propaganda and not only sound a warning against its further continuance, but to inspire greater effort toward a constructive propaganda. If, in addition to acknowledging that the human organism has a high degree of tolerance, Dr. Price will admit that she also possesses high efficiency power for the destruction of pathogenic micro-organic life, and will cease his efforts in attempting to sterilize the tissue around the apices of the roots and to leave that to nature and turn his attention and those of his associates solely to the sterilization and the successful filling of the root canals of pulpless teeth, the better it will be for all concerned. That is the one great question that the dental profession of this country is demanding that shall be answered. I do not offer the technic presented tonight as an ideal technic, but I do offer it as a technic that is safe and sound—a technic that has been successful in the hands of many men, a technic the success of which is backed by unlimited evidence and a technic that can be safely followed until such a time as something better can be offered. I cannot go into the discussion of the technic further, or is it possible to answer all the questions propounded by Dr. Price in his effort to smother me with camouflage.

I feel sorry for the members present and for myself if Dr. Price has been as successful in spoiling the effect of my paper among the rest of you as he seems to have for Dr. Acker, who says that he spoiled it all and that we know no more than we did before. I have a ray of hope, however, when he makes the statement that he could have said all I have said in this lengthy paper in ten minutes. Frank always was a man of few words and quick action, and I presume he fills root canals in the same way.

I am glad that we have Dr. Pond with us. The securing of him by the Research Foundation is a step in the right direction, but Dr. Pond cannot do what he is undertaking to do unless he has the assistance of the very best men in the profession and quite a number of them, for he cannot do what he is undertaking unless he has the cooperation of a large number of men in actual practice, for I say to you and to him that laboratory tests and laboratory evidence unsupported by tests and evidence obtained in actual practice and upon quite a number of cases is of but little value.

In conclusion, I will say that Dr. Bishop made a good point when he said let us adopt some method of procedure in which we can be successful. The thing that is of the greatest importance at the present time to the dental profession and humanity from the dental standpoint is whether or not pulpless teeth can be so successfully filled that nature will tolerate them with less detriment to herself than she would receive if all pulpless teeth should be extracted and the efficiency of the grinding power of the human mouth destroyed forever. I maintain that the technic presented tonight makes the retention of most pulpless teeth a possibility, and if employed will save millions of teeth annually, thus conserving the masticatory apparatus of thousands upon thousands of our American citizens.

NAVY HOSPITAL CORPS TRAINING IN DENTISTRY

HOW BLUEJACKETS OF THE U. S. NAVAL SCHOOLS IN MINNEAPOLIS ARE ENTERING THEIR NEW FIELD OF INSTRUCTION

By Willard Connely, U. S. N. R. F.

A significant war work which invites duplication at other dental colleges is being carried on by the University of Minnesota.

How much dentistry can a reasonably intelligent student learn in four months? Hospital corpsmen from the U. S. Naval Training Schools in Minneapolis, under Commander Warren J. Terhune, U. S. N., will soon have an opportunity to demonstrate the extent to which their instruction counts. They go to sea in May. They will assist dental surgeons. Occasions will arise when these corpsmen must treat independently aching teeth or gums of their mates who report at the sick bay.

Perhaps it is because of the human failing to take a decided interest in oneself that the bluejackets are so alive to their exercises in prosthetics. They all display extraordinary keenness to see their own jaws in plaster.

Here are the dental subjects to which these hospital apprentices are introduced: Oral Surgery and extraction, oral hygiene, prosthetics and dental anatomy, radiography, operative dentistry. First the men are their own clinics, later they attend civilian patients. The dental training supplements other work at the medical college, work in therapeutics, bacteriology, anatomy, physiology, nursing, dietetics— but dentistry has asserted itself as a highly desirable specialty for the pharmacist's mate (the rating to which hospital corpsmen are promoted), if he is to be an all-round handy assistant in caring for the sick.

The Dean of the dental college, who marshaled his associate professors and outlined this unique course, believes that for emergency work the instruction in surgery and extraction is of especial import. And war is assuredly one emergency after another.

Consequently it may be worth while to sketch this typical study in some detail, including an analysis of the classroom and laboratory teaching leading up to practical application of the rudiments. The hundred sailors (a company of one hundred has been detailed to the university every four months, by the Bureau of Medicine and Surgery) are divided into sections of five or ten men. After the first six weeks of fundamental lectures the extraction clinics and demonstrations begin, then more and more work is given the corpsmen in this department until the end of the semester. By that time they are able to inject novacain and to handle the forceps with pretty good results.

First, anatomical considerations are taken up, and indicative skulls are employed to show the osseous framework, its importance, density, and thickness of the process in different regions. Points stressed are the areas of natural porosity and the accessibility to foramina. Then each tooth is described and compared with others in size, shape, number of roots, with position of each root in the alveolus and special reference to strength or weakness of the bony plates. The relation of one tooth to another in normal denture is illustrated, and how the arch is built up with the teeth in contact. Skulls and casts are also presented to show breaking down of the arch and shifting of teeth in abnormal occlusion.

Oral surgery demonstrations the corpsmen receive in small groups. The apprentice behind the chair is taking instructions from the professor, who points out the essential technic by use of the skull.

Next the nerve supply is discussed. In their medical work in anatomy and physiology the corpsmen study neurons intimately, so when they come to trace the fifth nerve distribution and the landmarks for reaching it they are studying more or less familiar ground. Further sub-headings are blood supply to parts, glands—location, size, function—and temporo-mandibular articulation. This last covers structure, movements, conditions in luxation, manner of dislocation reduction. Knowledge of such a detail is held highly useful aboard ship, particularly if the ship encounter rough weather in the war zone.

"If you are the only representative of the medical department aboard a small boat" said one of the professors to the navy students, "you will be mighty glad, before the war is over, that you can lend a little first aid on jaw injuries".

Naturally the second general subject is indications for extraction. Description and illustration are by sketches, casts, skulls, and clinical cases of what constitutes useless and harmful teeth. Since one thousand extractions weekly are performed at this college it can be concluded that the bluejackets see a broad variety of conditions. The men learn to recommend extraction in cases of more than half decay; pyorrhea; abscesses acute, chronic, with fistulæ following muscle sheath and opening in remote region as in zygomatic fossa or floor of antrum of Highmore, or those tending to point through skin of face; impacted teeth, as cause of neuralgia, irregularity, decay in other teeth; supernumerary teeth; fractured teeth involving the roots; teeth perforated in treatment or by decay; teeth devitalized before calcification is complete; deciduous teeth retained too long; useless teeth in preparation of mouth for artificial denture; extruded teeth impinging on gum of opposite jaw; certain teeth in practice of orthodontia; teeth sensitive or irritating because of position or interfering with speech. To read over these familiar conditions is doubtless tedious to dentists; I give them merely to suggest the extent of the navy study and practice. Each sailor is required to diagnose, and a record of his calculations is kept.

In no better way can these hospital apprentices learn to examine teeth and to use instruments with care than by practicing upon one another. They are taught not only to discover cavities but to fill them as well.

Ensuing is a discussion of modern equipment models—dental chair, sterilizer, linens, lap covers, how to provide and use the emergency chair. It is the emergency chair indeed which will have to be set up on many occasions at sea. Then a talk on the instruments, and all apprentices are taught to use the following, on actual patients: tweezers, mouth mirrors, lances, curettes, explorers, probes, hypodermic needles, mouth props, artery forceps, chisels, tongue depressors, tongue forceps, pharyngeal forceps, burs, screw portes, various extraction forceps, elevators. Ships not carrying dental surgeons will not have an entire set of instruments, but a man who knows them all knows enough to use a limited number fairly well. Complementary to this phase of the work is of course instruction in giving nitrous oxid and novocain. The corpsmen learn to vary the strength of the solution according to the condition, to prepare the part, to choose the proper needle. Clinics are held in conductive, infiltration and interosseous anesthesia. In administering nitrous oxid, treatment for cyanosis is also explained.

Considerable time is given to after-treatment of extraction. To control hemorrhage the apprentices are shown how to use adrenalin chlorid, tannic acid, alum, to pack sockets with cotton, and in extreme cases the methods of pressure, ligation, cauterization. To control pain the men use KBr or antipyrin, eugenol on cotton, euroform paste, or novocain sprays. Demonstrations of surgical interference are given, such as removal of blood clot, restimulating hemorrahge, clipping off sharp process, covering exposed bone tissue with gum flap. In treating infection, iodin, peroxid or Dakin solution are employed. The mouth wash of warm salt water is a constant suggestion, with emphasis on regularity of the alimentary canal.

In surgery the sailors assist at such operations as replacing and stitching a process fracture, including antral sinus floor loosening, reimplantation when wrong tooth is removed, restoring dislocated mandible, setting fracture of mandible by ligation, wire splints, inter-dental splints and four-tailed bandages, treatment of shock.

As soon as the bluejackets were aware of the dangers of impacted teeth they all wanted radiograph pictures made. As a result it was seen that most of their fears were unfounded, but nevertheless many semi-erupted third molars were extracted by the instructors. Many fillings have been made too, and the corpsmen all cleaned the teeth of one another. They will go to the fleets with teeth which will set a healthy example to their mates serving in other capacities. Moreover, each hospital apprentice will talk vehemently on the necessity of oral hygiene, for he has learned that the devastations of streptococci, staphylococci and pneumococci, sallying from their nests in the mouth, are more appalling than the ravages of the German armies.

Operative dentistry training shows them how to prepare cavities and to fill temporarily. After beginning on extracted teeth the men work on civilians.

Passing to the work in oral hygiene as conducted for the navy men by that department, the students are given demonstration periods showing the causes and treatment of gingivitis and pyorrhea. Charts, casts and photographs are used to vivify the bacterial, malocclusive and systemic causes, as well as the symptoms, of these conditions. The men are taught to use the instruments for removing calculus and stains. Preliminary to cleaning their own teeth the sailors of each section have their mouths examined by the instructor, who points out pathological conditions and suggests methods of treatment. Later the corpsmen examine civilians for such diagnosis.

Factors which cause dental caries are carefully studied, leading to a consideration of hygienic diet and the technic of cleaning and brushing teeth. Tooth movement or shifting is another topic. and not a man but resolves to keep for life his lower first molar at all costs. Finally the bluejackets are severely drilled in the matter of systemic disease which follows unhealthy mouth conditions. The bacteria which from gingivitis or blind abscesses enter the blood stream are shown to be responsible for rheumatic pains in joints or muscles, nervousness, and malaise, and in more aggravated cases for arthritis, heart disease, nephritis and stomach ulcer. Verily these hospital apprentices, when they arrive at active sea duty, will eliminate first the teeth when an ailing sailor presents himself in the sick bay. These are days of training which is liberal.

In prosthesis all the boyish carpenter instincts crop out, and the navy students bend intensely to their exercises. They start this course by making full upper and lower impressions with the modelling compound, from which they mould plaster casts and mount them. The next work is to model in clay the upper and lower jawbones, then to insert properly along the alveolar ridges the thirty-two teeth, selected from a mixed trayful of old extractions. Here is where the men learn the essential formations of the dental arch and the tooth inclines. In the upper jaw they are required to indicate the median line, tuberosities, infraorbital and posterior palatine foramina, anterior palatine and retro-molar fossæ, posterior dental canals and the mylo-hyoid groove. On the mandible they locate the condyles, sigmoid notch, coronoid process, ramus, body, mental and mandibular foramina, external and internal oblique lines. Such a truly synthetic bit of instruction is invaluable to the bluejackets from the standpoint of their comprehension of elementary dentistry. These productions are more than trophies, souvenirs. They are veritable texts, to be studied profitably for reference.

These laboratory duties conclude with cutting tooth sections, cross and longitudinal. An anterior tooth is cut to the center of its pulp cavity, and the relative thickness of enamel, dentine and cementum is remarked. Then an upper molar is ground down until the pulp cavity is opened up. Removing its occlusal wall, the openings into the various root canals in the floor are located. Lastly the procedure is repeated for a lower molar.

There is an operative dentistry room with fifty-six chairs at this college. Here the corpsmen observe the technic of preparing cavities and making fillings. Their training in this branch is based on lectures and demonstrations in histology of the teeth, after which the technic of procedure for removing decay and applying treatments is given. First the men use the engine on extracted teeth, they break down the enamel with chisels, they make the retention form for temporary fillings. Uses of filling materials of course constitute the next step, when the sailors prepare ZnO cements and amalgams. Temporary stopping and treatment of infected teeth follow, then sealing the cavity and varnishing with cotton. It is felt that this much experience will enable the apprentices to give patients definite relief, until the dental surgeon arrives or until the ship reaches port, and that thereby many a good tooth which would otherwise be extracted can be saved.

So much for a general survey of this first attempt to impart useful dental knowledge ashore to hospital corpsmen of the Navy. Naval officers at the Minneapolis station and authorities at the university are confident that the innovation is well advised. One test of the training is that dozens of these ambitious bluejackets have averred there is nothing they would rather do than study dentistry. War is a powerful discloser of talent.

Preparedness League of American Dentists

Reports, News and Notes

OUR NEXT MOVE

We do not want members of the League to get the idea that the great drive now going on to help make our National Army dentally fit is the sole object of our organization. It is but one of a series of our activities. The development of our Dental Motor Car is a signal illustration of the great possibilities before us.

Those of us who are not commissioned and continue in civil practice must devote our energies to prepare to give expert services to our soldiers who have been injured in battle. We will find ourselves in need of all the skill we can summon, therefore, I would impress upon our members the great advantage of forming sectional units of the League throughout the whole country for the study of war oral and dental surgery. We are proud to say that our Dental Reserve is over-filled and service in that direction is amply provided for. However, if later on more are needed, the study course will the better prepare us. I therefore, strongly urge the promotion of this object and point with pride to the splendid record the League already has made in that direction. More than one hundred sectional units have given such a course which has been the means of assisting several hundred to pass examinations to the Reserve Corps, as well as promoting their advancement to higher commissions and positions in the service.

"Knowledge is Power" and is the best weapon at our command to overcome the results of disaster. It is our duty to marshal our forces as rapidly as possible for this object, as already our boys are beginning to return sadly in need of our best service and the great battle which has been fought will bring thousands upon thousands to whom we must minister. Every dentist, whether or not a member of the League, should make this a personal matter and if not near a League Unit, interest himself in forming one in his neighborhood and we will gladly supply all information and give the needed assistance.

Awaken to this call and put your shoulder to the wheel, otherwise you may realize later that you have not done all you might have done for your country. By communicating with the office of the president, 131 Allen street, Buffalo, N. Y., we will give you full instruction as to the procedure.

LECTURE AND SLIDES

The League has prepared a synopsis lecture accompanied by slides showing cases of plastic and oral surgery before and after treatment; a series covering our free dental activities and a third showing our new Dental Motor Car.

Twenty-five sets have been distributed to different state directors for use by Sectional Units of the League and all other societies. We urge their use at state society meetings. The laity, also, will be interested. Assignments may be made by your state director or through the office of the president, 131 Allen street, Buffalo, N. Y.

IMPORTANT NOTICE

It has come to the attention of the president of the League that a pamphlet is being circulated advising our members to charge selective service men who are able to pay for the service necessary to make them dentally fit.

This pamphlet is *SPURIOUS* and the originators deserve no better treatment than internment during the war as cohorts of the

Kaiser. It is but another vain attempt to abort the principles upon which the League is founded and which will live for ages after the perpetrators of this un-American and despicable subterfuge have become naught but a blotch of mold upon our fair soil, and the unfairly acquired gain has been dissipated without benefit to themselves or their families.

I trust all loyal dentists will exert themselves to give this stigma the lie by strictly adhering to the only principle that can make our organization live and be of vital importance to humanity and our country in this great crisis.

J. W. Beach, *President.*

March 29, 1918.

I try from time to time to visualize what you are doing, and how the work is going in your State, and can only judge of the operations performed, by the reports received at Headquarters and by the letters received from you and others in your State.

We are glad to have you write often and keep us posted on League matters in your State, as it gives both help and encouragement at Headquarters.

We shall also try to keep you posted as to how League matters at large are progressing, for your interest.

I would advise that you occasionally send a letter of encouragement to each of your County Directors. It will keep them in closer touch with you, and they are apt to take a greater interest in their work.

LEAGUE MEMBERSHIP

The League has a membership of 13,600 to date. This number should be increased to 30,000 members at once. Ask your County Directors to endeavor to get every member to enlist at least one more member.

The United States now has more than 1,500,000 men under arms, and up to date we have records of work done by the League, of approximately 200,000 operations, but if each had done his part, this number would have been doubled. Some individual members have performed as many as 150 operations; others (new members), none at all, as they have not yet had the opportunity.

Our organization should perform 1,000,000 operations for the men of the next draft.

It is important to keep before the minds of all members, the fact that we should devote our energies almost entirely to men qualified for general military service. These are the men who will do the actual fighting and who must live in the trenches, and who, consequently, are more subject to sickness and infection.

R. Ottolengui,
Director of Publicity.

EDITORIAL

EXTRACTING TEETH FOR REGISTRANTS— A WARNING

Some months ago The Summary referred to reported cases of tooth extraction in the mouths of registrants and warned dentists to be careful about what teeth they extracted and how many. Our attention has again been called to the subject by Dr. L. E. Custer, member of the Medical Advisory Board for Dayton (Ohio) district. Dr. Custer says: "I happen to be on the Medical Advisory Board here, not from choice. We have had several cases where the subject had just been in the care of a dentist before being examined, and either intentionally or through ignorance, teeth with mere cavities were extracted, and the subject was necessarily placed in a lower class, and in one case rejected. If these dentists cannot give the amount of time for saving these teeth they should not extract them, for they will count in the examination and can be cared for in camp. I think it would be well to call attention to these things through your journal."

This is an important subject and it should be thoroughly understood by every dentist, so we quote from the Manual of Instructions for Medical Advisory Boards as follows:

DENTAL REQUIREMENTS

Regulations for the Local Board. (Section 185, S.S.R.)

Accept registrants who have three serviceable natural masticating teeth above and three below opposing and three serviceable natural incisors above and three below opposing. All these teeth must be so opposed as to serve the purpose of incision and mastication. Therefore, the registrant shall have a minimum total of six masticating teeth and a minimum total of six incisor teeth.

The needed dental treatment will be performed at the cantonment. However, if time permits, a registrant, if he prefers, may have the necessary work done at home previous to his induction into military service.

DEFINITIONS

(*a*) The term "masticating teeth' includes molar and bicuspid teeth, and the term "incisor" includes incisor and cuspid teeth.

(*b*) A natural tooth which is carious (one with a cavity) which can be restored by filling, is to be considered as a natural serviceable tooth.

(*c*) Teeth which are restored by crowns or dummies attached to fixed bridge work, when well placed, shall be considered as serviceable natural teeth, when the history and the appearance of these teeth is such as to clearly warrant such assumption.

(*d*) A tooth is not to be considered a serviceable natural tooth when it is involved with excessively deep pyorrhea pockets, or when its root end is involved with a known infection that has or has not an evacuating sinus discharging through the mucous membrane or skin.

Refer all other cases to the Medical Advisory Board.

No registrants can be rejected on account of teeth defects. (C. S. S. R. No. 3, Jan. 28, 1918.)

Regulations for Medical Advisory Board.

The dentist on the Medical Advisory Board shall re-examine the teeth of all registrants referred by the Local Board.

When this examination demonstrates that the registrant has the number and character of teeth placing him within the standards of unconditional acceptance as clearly defined in the regulations to the Local Board, section 185 S. S. R., the registrant shall be accepted for general military service.

All other registrants who do not come within the standards of unconditional acceptance of dental requirements shall be accepted for special or limited military service (Group C).

URGENT SUGGESTION FOR THE BENEFIT OF REGISTRANTS ACCEPTED FOR GENERAL MILITARY SERVICE

The dentist on the Medical Advisory Board is urged to consult and co-operate with the dentist on the Local Board to devise ways and means of persuading registrants accepted for general military service to have urgent dental work done pending receipt of orders to report for duty.

All hopelessly-diseased teeth should be extracted. Chronic focal infections involving the teeth and jaws should be eradicated. If this is done before the registrant reports for duty at the cantonment, the necessary plate work can be more quickly placed at the cantonment, and even more important, the registrant will be protected from systemic complications which are liable to occur when the individual is placed under the strain of military training.

Only hopelessly-diseased teeth should be extracted. A natural tooth which is carious and can be restored by filling is considered a natural serviceable tooth. If a dentist extracts serviceable teeth, although decayed, thinking it the quickest way to finish the work for a registrant, he is to a certain extent maiming that applicant and doing something that hinders the drafting of men for army service. Remember there is a heavy penalty for this and it behooves dentists to either give registrants honest service or no service at all.

Dentists should be careful to avoid extracting teeth so that the number would be below the minimum required. The government has issued a warning that dentists who extract teeth to the extent of incapacitating men, within the conscription age for military service, will be prosecuted to the fullest extent of the Federal Government. We trust that dentists who have been careless in these matters will hereafter give full consideration to the cases under their care.

ANOTHER RECOGNITION FOR DENTISTS

As we are going to press we learn that the government has just issued an order to at once appoint dentists as official members on all Local Draft Boards. This is as it should be, and we are glad that the profession has received this recognition.

Program for The Section on Stomatology of The American Medical Association, June 11-14, 1918

Chairman's Address——————Dr. Frederick B. Noyes, Chicago
1. Chancre of the Lips Following Injury with Dentist's Emery Disk, Dr. Adelbert M. Moody, Chicago
2. An Analysis of Two Hundred Cases of Malignant Diseases in the Oral Cavity by Electro Thermic Methods, or in Combination with Operative Surgery, X-rays or Radium————Dr. William L. Clark, Philadelphia, Pa.
3. Treatment of Epithelioma of the Jaws and Cheek, with Heat and Radium, Dr. Gordon B. New, Rochester, Minn.

Discussion Opened by Dr. Albert T. Ochsner, Chicago, Ill.

4. The Lipoids of Tumors of the Dental System, Dr. Kaethe W. Dewey, Chicago
5. The Genesis of the Epithelial Debris in the Peridental Membrane, Nasmyth's Membrane and the Granular Layer of Tomes, Dr. Eugene S. Talbot, Chicago
6. Additional Roetgenographic Studies of Infections of the Maxillary Bones, Dr. Arthur D. Black, Chicago
7. Microscopic Studies of Diseased Peridental Tissues, Illustrated by Stereopticon ——————Dr. Edward H. Hatton, Chicago
8. Absorption of the Roots of Teeth——————Dr. Herbert A. Potts, Chicago
9. Longitudinal and Transverse Sectional Views of the Accessory Sinuses of the Human Cranium, Cut-Parallel and at Right Angles to the Nasal Septum——————Dr. Geo. Edward Fell, Chicago
10. Fractures of the Bones of the Face, with Complication, Dr. Vida Latham, Chicago
11. Fractures and Dislocations of the Jaws, Dr. Chalmers J. Lyons, Ann Arbor, Mich.
12. A New Surgical Procedure for Operating in Cases of Suppurative Gingivitis with Alveolar Involvement——Dr. Arthur Zentler, New York City
13. Neuralgia Dentalis——————Dr. Kurt H. Thoma, Boston, Mass.

Dr. Frederick B. Noyes, *Chairman*
Dr. Eugene S. Talbot, *Secretary*

The Officers of The Section cordially invite those who are interested in the program to be present and take part in the discussions.

SOCIETY·ANNOUNCEMENTS

Northern Ohio

The annual meeting of The Northern Ohio Dental Association will be held at Toledo June 6th, 7th and 8th. Program will be announced later.

Ohio State Board

The Ohio State Dental Board will hold its regular June examinations the week of June 24th at Columbus, Ohio. The Practical the first three days of the week, at the Dental College, and the University Campus. Preliminary Practical Examinations will be given Theoretical the last three days of the week, in the Armory on the State at the Ohio and Cincinnati Dental Colleges, Monday, Tuesday and Wednesday, May 20th, 21st and 22nd. At Columbus Thursday, Friday and Saturday, May 23rd, 24th and 25th. At Cleveland June 3rd, 4th and 5th.

R. H. Vollmayer, *Secretary,*
Nicholas Building, Toledo, Ohio.

Indiana State Board

Next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, June 17-22, inclusive. Applications and other information may be obtained by addressing H. C. McKittrick, Secretary, Indianapolis, Ind.

Illinois State

The fifty-fourth annual meeting of the Illinois State Dental Society will be held at Bloomington, Ill., May 14-15-16-17, 1918.

J. P. Luthringer, *Secy.*

Michigan State Board

The next meeting of the Michigan State Board of Dental Examiners will be held at the dental college, University of Michigan, Ann Arbor, Mich., June 17 to 22, inclusive. Applications and other information may be obtained by addressing

B. S. Sutherland, *Secy.*,
Owosso, Mich.

Kentucky State Dental Association

The next annual meeting of the Kentucky State Dental Association will be held at Lexington, Ky., June 13-14-15, 1918. An "amalgam program of special interest." Address all correspondence to Dr. W. M. Randall, Secy., Louisville, Ky.

Pennsylvania State Board

The next examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Wednesday, Thursday, Friday and Saturday, June 12, 13, 14 and 15, 1918.

The examination in Practical Work will be in the Evans Dental Institute, 40th and Spruce streets, Philadelphia, and the University of Pittsburgh, Pittsburgh, on Wendesday, June 12th. The examination in operative work will be held at 8:30 A.M., and the Prosthetic Work at 1:30 P.M. Applicants are required to furnish all instruments and a patient for the operative work. The theoretical examination will be held in Musical Fund Hall, Philadelphia, and College of Pharmacy, Pride and Bluff streets, Pittsburgh, beginning at 9:00 A.M. on Thursday, June 13th.

Application papers can be secured from the Department of Public Instruction, Harrisburg. ALEXANDER H. REYNOLDS, *Sec.*,
4630 Chester Ave., Philadelphia.

Lake Erie Dental Association

The next annual meeting of the Lake Erie Dental Association will be held in Cambridge Springs, at the Hotel Bartlett, May 23, 24 25, 1918. We have some good essayists in view and will be able to report the program within three or four weeks.

DR. CLINTON L. MCCHESNEY, *Sec.*,
616 Warrington Ave., Pittsburgh, Pa.

West Virginia State Board

The annual examination of candidates for license to practice in the state of West Virginia will be held at Parkersburg, W. Va., June 25, 26 and 27, 1918. Blanks and information will be furnished on application to the undersigned.

H. H. SMALLRIDGE, *Secretary*.

Iowa State

The fifty-sixth annual meeting of the Iowa State Dental Society will be held in Des Moines, Ia., May 7-8-9, 1918. An excellent program has been prepared, including seminars, papers and clinics. A cordial invitation is extended ethical members of the profession from out of state to attend any or all of these sessions.

E. R. SWANK, *Secy.*,
Panora, Ia.

Tennessee State Board

The Tennessee State Board of Dental Examiners will hold their next meeting on June 11-15, inclusive, at the Hermitage Hotel, Nashville, Tennessee. W. G. HUTCHISON, D. D. S., *Secretary*.

Tennessee State Dental Association

The fifty-first annual meeting of the Tennessee State Dental Association will be held in Nashville, Tenn., June 17, 18 and 19, 1918.

GEO L. POWERS, *Sec.*,
Paris, Tenn.

Washington State Dental Society

The Annual Meeting of this Association will be held in Spokane, June 27, 28, 29. An excellent program is being prepared and will be mailed about May 25. A. D. REMINGTON, *Secretary.*

North Dakota State Dental Association

The North Dakota State Dental Association will hold their annual meeting at Grand Forks, North Dakota, May 21, 22, 1918.

ALBERT HALLENBERG, *Pres.*,
SOLON CRUM, *Sec.*,
Fargo, N. Dak.

North Carolina State Dental Society

The next annual meeting of the North Carolina State Dental Society will be held at Wilmington, N. C., June 19-21, 1918. Headquarters, Oceanic Hotel. W. T. MARTIN, *Secretary*,
Benson, N. C.

South Carolina State Board

The annual meeting of the Board of Dental Examiners in the state of South Carolina will be held at The Jefferson, Columbia, S. C., beginning promptly at 9:00 o'clock, Monday morning, June 24th, 1918. All applications must be in the hands of the secretary by June 14th. Application blanks and full information may be obtained by addressing

R. L. SPENCER, *Secretary*,
Bennettsville, S. C.

Georgia State

The semi-annual meeting of the Georgia State Dental Society will be held in Atlanta, Ga., June 12, 13 and 14. This society will celebrate its fiftieth anniversary.

Florida State

The Florida State Dental Society will hold its next annual meeting at the Atlantic Beach Hotel, Atlantic Beach, Fla., on June 20, 21, 22, where fishing, golfing and surf-bathing are unsurpassed. A fine program is being planned. All ethical practitioners of this and other states invited to attend. For further particulars address D. D. Crews, D.D.S., secretary, Fort Myers, Florida.

CORRESPONDENCE

Four State Post Graduate Dental Meeting

Alabama-Mississippi-Texas-Louisiana

New Orleans, March 15th, 1918.

DEAR DOCTOR: From the way applications are coming in for membership in the Four States Post-Graduate Dental Meeting, those who procrastinate will certainly lose out. From present indications the membership limit will be over subscribed long before the time set. Membership cards will be issued in the order in which requests are received by mail. Please note the following:

Place of meeting—New Orleans.
Date of General Meeting—June 3-4-5-6.
Date of Special Courses—June 7-8.
Membership limited to 350.
Membership cards will be issued only to members in good standing of their State Society.
Last day for Registration—May 27.
Fee, General Meeting—$10.00 per member.
Fee, Special Courses—$15.00 per member.
No one will be issued a special course card unless registered for General Meeting.

Owing to the fact that our Registrar, Dr. C. V. Vignes, has been commissioned in the Dental Reserve Corps, and is subject to the call of the Government, Dr. L. C. Dempsey, the General Secretary, 943 Jackson Ave., will receive all applications and issue membership cards.

The subjects selected to be taught at this meeting and instructors positively engaged are as follows:

Dr. Arthur E. Smith—Conductive anesthesia—which will include all Dr. Smith's latest methods, for the various uses of conductive anesthesia.

Dr. Elmer S. Best—Technique of Root-Canal Preparation, treatment and filling.

Dr. Rupert E. Hall, Chicago—Full upper and lower dentures.

Exodontia will be taught by someone of national repute—Instructor not as yet definitely selected.

It will be well to note here that the Four States Post-Graduate Dental Meeting of Alabama, Mississippi, Texas and Louisiana is quite different from the various so-called Post-Graduate Meetings held in other parts of the country. At this meeting we offer a General course in which the four subjects are taught in detail by illustrated lectures and clinics to every member, in a general way. At the end of the four days meeting, after you have heard each instructor and decided upon which subject you would like to get special personal instructions in, you can join that particular class by paying the special course fee. This course will take two days—June 7 and 8.

The Committee in charge has made it a special feature to engage no instructor for this meeting who has recently given his subject in the south or who expected to do so before the time of our meeting.

Hotel Grunewald, the headquarters for this meeting, has made special rates for the members of this meeting and their families:

Rooms with private bath—One person, $3.00 to $4.00 per day.
Rooms with private bath—Two persons, $4.00 to $5.00 per day.
Rooms with detached bath—One person, $1.00 to $1.50 per day.
Rooms with detached bath—Two persons, $2.00 to $2.50 per day.

Remember procrastination is the thief of time, now is the opportune time, get busy. Yours truly,

J. P. WAHL, *Chairman Publicity Committee.*
Four States Post-Graduate Dental Meeting.

"*Vale*" Dental Process Patents

TO THE EDITOR OF THE DENTAL SUMMARY:

On March 4th, Judge F. A. Geiger of the Federal Court for the Northern District of Illinois, filed a decision which closed the longest and hardest chapter in the history of the litigation involving the Taggart Cast Inlay Patents. The thirteen cases just decided by Judge Geiger will now go to the highest Court of Appeals, where the final chapter will be written.

Dr. Taggart's infringement suits against myself and twelve other practicing dentists of Chicago were selected from five hundred twenty-three (523) similar suits to be defended by The Dentists' Mutual Protective Alliance in order to secure a final and conclusive adjudication upon any and every question which could arise under any of the four Taggart patents. Every one of the questions raised by the attorneys for the Alliance or the attorneys for Dr. Taggart is now decided in favor of the defendants, who were sued for an injunction and for profits and damages.

The four Taggart patents cover every phase of the production of a cast inlay from the formation of the wax pattern to the setting of the casting. The patents contain forty-six claims covering all of the steps of the process, all of the apparatus including rings, flask-covers, sprue-formers, etc., and the products resulting at the various stages of the process, such, for example, as the wax pattern itself, the mold and the final casting. One of the claims of one of the patents covers "a dental inlay formed entire of cast metal." Any filling described by this claim would infringe the Taggart patent, no matter how made.

Every patent suit involves the determination of two questions: First, the validity of the patent, and second, whether any claim of the patent is infringed. Every dentist who makes or sets a cast inlay filling infringes a majority of the claims of the Taggart patents. There was no question but what the defendants in these thirteen test cases infringed many claims of the several patents. The question to be determined was, therefore, whether these claims were valid.

Judge Geiger's decision is to the effect that these claims are not valid because they do not cover processes or apparatus or products which were new and original with Dr. Taggart. They had all been developed, used and given to the profession long before Dr. Taggart sought to monopolize them for use only by himself and those whom he might see fit to license upon his own terms.

The defendants in these thirteen test cases use all sorts of casting machines as for example, the Elgin Vacuum Machine, the Simple Pressure Machine, Moist Pad Machines and Centrifugal Machines. All of these machines were held not to infringe the claims covering the Taggart Casting Machine.

The scope and variety of questions covered by this decision are such that every dentist can now know with certainty just what he may do and just what he may not do without making himself liable to an injunction and money-judgment.

It has been the purpose of The Dentists' Mutual Protective Alliance to secure a final and conclusive adjudication upon every possible question which can arise under a dental process patent, so that the profession may not be threatened, badgered or coerced into paying tribute upon their manipulative skill except by the sanction of a Federal Court of last resort.

Dr. Taggart's attorneys have announced that these thirteen test cases will be taken to the Court of Appeals, which is the court of last resort in patent cases.

The Alliance hopes to receive sufficient support from the profession to finance the presentation of these cases before the Court of Appeals in the same thorough-going fashion in which they were tried in the lower court. Having accomplished this, we shall feel that we have completed a valuable service to every American practitioner. Every dentist will then be in a position to say to Dr. Taggart one of two things. He may say: "Yes, Dr. Taggart, your patents have been adjudicated and found valid. I will pay you all of my past profits upon cast inlays and discontinue their use in the future except upon such terms as you may see fit to name." Or, he may say: "No, Dr. Taggart, the highest court has determined your claims to be invalid. You cannot force me to pay tribute."

The Dentists' Mutual Protective Alliance has sought to put its members in a position to make one answer or another, but in any event to make the answer *final.*

Judge Geiger's written opinion is too long to quote in full—some thirty-three typewritten pages. Its preparation involved the consideration of an enormous mass of testimony and hundreds of exhibits illustrative of dental apparatus and procedures, and of dental publications.

It was necessary in order to establish the invalidity of the Taggart patents to prove beyond a reasonable doubt that the method of the Taggart patents had been used prior to 1907 in making cast inlay fillings. Just to illustrate the complexities which may arise in the determination of this simple question, let me cite the following:

On March 6, 1915, Paul Grindle, who was then nineteen years of age, exhibited a gold tip upon an upper central incisor. He testified that this tip had become necessary because of an accident which had occurred in 1905, at which time the entire crown of the tooth had been broken off. Dr. H. P. Bachman, of Decatur, Ill., testified that this gold tip, which had been set by him in 1905, was cast in accordance with the method of the Taggart patents.

It was clear that the root canal was exposed by the fracture and that it must have been filled.

After Dr. Bachman had testified and after Grindle had testified and exhibited his gold-tipped incisor, it was claimed by expert witnesses on behalf of Dr. Taggart that Grindle's tooth could not have been so far developed in 1905 (when he was only nine years old) as to make it possible to fill the root canal in any way which would have permitted Grindle to have retained the tooth until he was nineteen years old. On the other hand, the defendant's experts claimed that this root canal might have been sufficiently constricted at the age of nine years to have permitted a successful and permanent root-canal filling.

The point of this controversy was, of course, to determine whether Dr. Bachman and his patient were correct in fixing the date when this work was done. If it was done after January 12, 1907 (the date of the Taggart patents), it could not affect their validity. If it was done before that date, it would make them invalid.

After the expert witnesses had expressed their opinions pro and con, and after Black's charts and treatises had been presented and studied, an X-ray photograph was taken and introduced in evidence showing that the root canal was only slightly constricted—the development of the apex was by no means complete. Still, the root canal had been treated and successfully filled and the gold-tipped tooth had served Paul Grindle in good stead, at least up until the date of the final session of the trial.

I cite this instance merely to indicate the ramifications of dental technic into which the trial of these cases necessarily developed and to indicate the wide range of dental practice which Judge Geiger found it necessary to cover in preparing his opinion. I do not think it is my prejudice alone which prompts me to say that Judge Geiger summarized and disposed of the many questions in a masterly way.

I am told that these cases involved the longest open court trial which has ever been had in a patent case. It was necessary to bring to Chicago scores of witnesses, not only dentists, but their patients, many of whom were compelled to exhibit work done in their mouths many years ago.

I feel satisfied that every clue which might by any possibility have led to the production of any evidence which could have had any possible bearing upon the questions at stake was thoroughly investigated in advance of the trial. Our attorneys went personally into some twenty-six states in order to investigate evidence which had been suggested upon one point or another and in order to locate witnesses who, during the past twenty-five years had moved their residences. When all of these witnesses came to Chicago at the time of the trial, the Great Northern Hotel, in which they were quartered, took on almost the aspect of the infirmary of a post-graduate dental college.

It would be almost impossible within the compass of this contribution to give adequate credit to the several dentists who, prior to 1907, contributed much or little as the case may have been, to the development and perfection of the cast inlay process.

The Alliance will be glad to send complete copies of Judge Geiger's opinion to dentists who would be interested in reading it.

Respectfully yours,

M. D. K. BREMNER.

1210 North Clark Street, Chicago, Ill.

Texas State Board

The next regular examination of the Texas State Board of Dental Examiners will be held in San Antonio, Texas, beginning June 17th, 1918, at 9:00 A. M. No diplomas exchanged; no reciprocity.

The application fee of $25.00 should be in the hands of the Secretary not later than June 12th. For further particulars and application blanks address HARRISON B. CAVE, *Secretary*,
810-14 Wilson Bldg., Dallas, Texas.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

ANNOUNCEMENT

Beginning July 1, 1918, the subscription price of THE DENTAL SUMMARY will be increased as follows:

United States and Possessions	$1.50
Canada	1.90
Foreign, U. P. U. Countries	2.25

This increase is made positively necessary by the rise in the price of paper and cost of production generally, and will remain in force only so long as war conditions prevail.

Subscriptions received prior to the date named will be accepted at the old rate.

A fund is being raised for the benefit of homeless dentists in France. Why not enlist them in some of the army units? They could there practice their profession and serve their country well.

Chicago society is running down unlicensed practitioners. Plenty of work ahead.

If present reports are reliable it seems hardly possible that Hun Hindenberg will eat his April Fool dinner in Paris this year.

The dental motor car designed by Dr. S. M. Weaver of Cleveland, was at Camp Meade, Pa., at last accounts. It meets with hearty commendation everywhere.

Have you bought your Third Liberty Bond?

Bond issues come and go; but the W. S. S. we have with us as a constant reminder that the stars and stripes does not yet float over Berlin, and that the world has not as yet been made a decent place in which to live.

Bates & Bacon, Attleboro, Mass., one of the largest manufacturers of jewelry, has put in equipment for the manufacture of artificial teeth for the foreign trade, with the direct object of competition with Germany. An entirely new invention, that of a prominent New York dentist, is said to be embodied in the new product.

Reports that Dr. J. A. Ogden, Calumet, Mich., dentist, had been killed in France, have been contradicted by letters received direct from the Doctor. He is still hard at work with the Canadian forces "over there."

One $800 robbery is reported from Pittsburg. Think the printer added one cipher too many How many dentists do you know who carry such an amount of filling gold?

The opening of school clinics is reported from Boonton, N. J., Tonawanda, N. Y., Sioux Falls, S. D., Long Island City, N. Y., and Cohoes, N. Y. From Beloit, Wis., comes the report that the school clinics are likely to be abandoned for want of financial support.

Plans are being formulated to re-educate our crippled boys when they return from the front in order to help them to become self-supporting. The public schools probably will add departments for this work.

Every development since our entry into the war has justified and proved the wisdom, the imperative necessity of America's participation. Every German success and every German failure have shown how necessary to our own welfare and peace, how necessary to the safety and peace of the world the defeat of Germany is. Every foot of ground Germany has been forced to give up, every foot of land she has seized, have demonstrated the absolute necessity of defeating that sinister, intolerable thing called Germanism.

The Journal of the Association of Military Dental Surgeons of the United States, John D. Millikin, D. D. S., editor, San Francisco, Cal., is now published from New York, and Dr. Wm. C. Fisher, D. D. S., is associate editor and business manager. Published quarterly at one dollar per year. The Journal is filled with interesting articles for military dental surgeons and news notes and other information concerning our men in service. A worthy publication well edited.

Licking County Dentists Doing Things

Every recruit that went to camp in April from Licking County, Ohio, went with his teeth in first class condition. Members of the Preparedness League of American Dentists in that county will see that all recruits that go from there are dentally fit. The following is a clipping from a Newark (Ohio) daily paper:

Dentists' Preparedness League of America

"Boys of Newark (Ohio) leaving for war have had 178 fillings, 3 gold crowns, 14 extractions, 23 prophylaxis and 6 extractions made, the cost of which amounted to several hundreds of dollars. This put the Newark boys' teeth in good condition, at no expense whatever. The report

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XXXVIII June, 1918 No. 6

A METHOD FOR ELECTRO-STERILIZATION AND FOR ROOT FILLING WITH ZINC CHLORID AND A METALLIC ZINC CONE*

BY L. E. CUSTER, A. M., D. D. S., DAYTON, O.

UNDOUBTEDLY the most important question before the dental profession today is "what shall we do with the pulpless tooth," which is evidenced by the large part which it takes in this program. The physician says the pulpless tooth and all of them should be extracted. In some cases he is correct but in the majority of cases he is a bad actor and gives dangerous advice. We agree with him that where a tooth becomes a permanent germ foci and a detriment to health it should be extracted; but not where through careful treatment the dentin is rendered immune to future infection, and the apex is mechanically sealed in such a manner that nature kindly throws around her protective encystment.

Whether a pulpless tooth should or should not be extracted depends entirely upon the one factor—the presence or absence of pus in the apical region, and not upon a physician's wholesale decree. It rests with the dental profession, therefore, as a great responsibility, to make the pulpless tooth germ-proof so far as possible, and it is to its credit that distinct advances have been made in this direction. I cite you to the work of Rhein, Best, Prinz, Buckley, and whose achievements are not more brilliant than those of our own Callahan. I doubt if in all the range of a man's efforts to patch up a human being as much energy has been expended on as small an area as that at the tiny apical foramen.

If for years the surgeon has been successful in sealing into man's anatomy a piece of boiler plate the size of a person's hand, and if he can weave twenty or more feet of silver wire into him, or if the soldier returns from war practically waterlogged with lead bullets which he carries without serious inconvenience the rest of his life, is it not time that the dentist should be able to seal so small a thing as the apical foramen in a manner acceptable to nature? The answer lies alone in asepsis and good root filling.

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*Read before the Ohio State Dental Society, Dec., 1917.

The problem before the profession today is to cleanse, sterilize and completely fill the pulp canal with a non-irritating foreign substance. I need not spend time upon the importance and methods of pulp removal before such a body as this and will proceed to the sterilization and filling of the pulp canal.

Electricity as a sterilizing agent dates back to 1883, but was first introduced to the dental profession by Dr. M. L. Rhein in 1897; and in later years has been treated by Sturridge, Jones, Prinz, Fette, Ames and others.

Strictly speaking it is not electricity itself which sterilizes at all, but it is one or a combination of the three processes that go on simultaneously when a current of electricity is caused to flow through a liquid or semi-liquid conductor. These processes are all co-related and yet are quite different. First, we have Electrolysis in which the liquid is decomposed. Second, we have Ionization, which is a step further than simple electrolysis. The solution is not only decomposed but is split up with respect to the electro positive and negative character of the two bodies which we now call ions. These ions are charged respectively positive and negative, and move toward poles of opposite polarity where they unload their electric charges. It is by the splitting up of the liquid into ions that a liquid is able to conduct electricity. And the third phenomena is Cataphoresis, in which, under certain conditions, the fluid is caused to travel bodily from one pole to the other without suffering decomposition.

Now as to which or how many of these three processes is the real factor in sterilization is still a mooted question, and for our present purposes need not be discussed, for the fact still remains that, broadly speaking, electricity, when it flows through a liquid or semi-liquid conductor, has a bactericidal effect. This for a long time has been an accepted truth and is no longer questioned; and it remains for us simply to apply it in its most efficient way.

Reverting now to Dr. Rhein, whose work we suppose to be pioneer in this field, and comes nearest to what I have to offer. He used a pure zinc wire for the positive electrode in the tooth, and with this he used principally pyrozone. When an apical abscess was present he forced the zinc wire entirely through the apex, depending upon the electric action about the zinc wire alone to break up the abscess; and he claimed remarkable results from this procedure. I wish to impress upon you here his extreme faith, not only in the use of a zinc wire with some such agent as pyrozone, but in the wire alone at the apical foramen. But unfortunately he finishes the operation by filling the pulp canal with gutta percha.

The scheme of the writer is practically the same up to the point of the root filling. At present and until we become more skilled I am applying it to single-rooted teeth. I use a cataphoric outfit for the work and just here let me call attention to a point learned long ago: The closer the two electrodes are together the lower will be the necessary voltage; and a fluctuating current is less liable to be felt by the patient. The negative electrode should be placed opposite the root to be treated and not on the wrist. This electrode is made from a stiff wire about the size and shape of a lady's hairpin, and having a soft rubber polishing cup on either end. (*Fig. 1.*) The tension between the two cups is sufficient to hold the device in place on the alveolus. The spring terminates within the cups, which at each administration are to be filled with a fresh cotton pellet saturated with salt solution. The positive pole is the zinc cone, which later on may be used in filling the pulp canal.

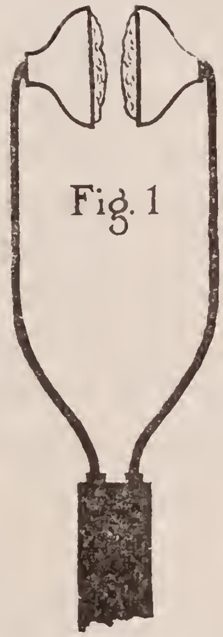


Fig. 1

The solution to be used in the pulp canal may be Dakin's solution or a few drops of alcohol, which, not being an electrical conductor, is made so by the addition of a few crystals of common salt. If it is desired to carry the sterilization out to the periapical region, a crystal or two of cocain also may be added with benefit. Either of the above solutions, themselves germicides, is placed in the pulp canal, and the positive electrode is introduced just far enough to make contact with the solution which will be shown on the ammeter. Do not yet force the cone to the apex, for then the principal effect will take place in the apical region. What we now want is to sterilize the dentin. Increase the voltage until the patient feels it. Now what happens? Simply this: two processes are going on in the pulp canal at the same time, namely: electrolysis and cataphoresis. Part of the solution is decomposed, liberating nascent chlorine, a decided germicide, and part is cataphorically carried into the tubuli and part through the apex. This procedure is to be kept up until the zinc cone, following up the evaporation of the solution, reaches almost to the apex of the root, and the ammeter-finger has returned to zero or thereabouts. This indicates that the solution has disappeared. Part has been driven into the dentin. part through the apex and part has passed into a gas. If now the zinc cone is forced through the apex the ammeter finger will suddenly swing some points to the right.

Here I will dwell a moment upon a most important finding and what would be food for a paper itself—that is, the use of the electric current in determining the length of the root of a tooth. If the pulp canal is dry, and a broach is electrically connected as it is for electro sterilization, if this broach is slowly and carefully passed through the root apex, the moment it contacts with live tissue will be indicated by the ammeter finger suddenly swinging several points to the right; and if the current should be very strong the patient will feel the same even before the broach actually punctures the soft tissue. The position of the broach is then noted. I have devised measured broaches for this purpose which will be shown in the clinic. This means of measuring the length of the pulp canal is more valuable than the X-ray, for it is just as accurate; and being used at the moment of root filling saves much time.

Returning now to the main subject, if infection is suspected in the periapical region, the zinc wire is forced through the apex and the current continued. The length of time necessary to sterilize electrically has been laid down by Prinz in the following formula: the current strength in milliamperes, multiplied by the time in minutes, should equal thirty or more. To illustrate: If the ammeter reads two milliamperes then the length of time of administration should be fifteen minutes; if the ammeter should read three, then ten minutes only will be necessary for the complete electro-sterilization of the pulp canal and the periapical region. Since the current is perceived by the patient when on an average two milliamperes are flowing, about fifteen minutes will be necessary for the average case.

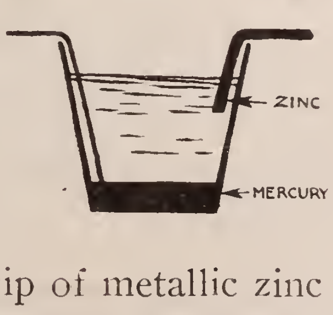
The pulp canal having been sterilized it is now to be filled, and in this case with a permanent conductor of electricity. But remember I say *filled.* Owing to the various shapes of pulp canals and some of them with multiple foramena, as shown by Callahan, it is mechanically impossible to perfectly fill with a cone of any material alone. We are absolutely dependent upon a plastic substance of some kind to be first introduced, and which upon the introduction of the cone will be caused to fill all the pulp-canal space. Plastic materials which depend upon the evaporation of the solvent to leave the remainder in a hardened state, all shrink. Chloro percha, the standard for years, will rattle around in a pulp canal. Rosin solution also shrinks; its principal virtue lies in the fact that it can be worked into the tubuli. On the other hand we have plastic fillers which do not harden by the evaporation of an ingredient but by crystallization. These do not shrink to any material extent and among them we find the old fashioned oxychlorid of zinc.

The oxychlorid as it comes to us will not conduct electricity, but it can be made to do so by previously mixing with the oxid powder about equal parts of precipitated metallic zinc. The mixed cement is worked into the pulp canal, and into the body of this is thrust a metallic zinc cone which is to be left there *forever*. That is the point. Leave the zinc cone in the pulp canal *forever*. This is not entirely new, for a metal filling was suggested by Weld some years ago.

The zinc cone being much stiffer than gutta percha gives the operator a more accurate sense of touch, and, if he is depending upon the sense of touch, he can tell much more easily when it has reached the apex. These cones I make not like the gutta-percha cones but from a pointed wire about two inches long which gives us a cone with a handle to it, which when finally pushed to its seat is cut off flush with the cavity so that in the future, if necessary, it can be exposed easily for electrical contact as will appear later on, or if it is surrounded by a metallic filling it need not be exposed.

The precipitated metallic zinc which gives the cement its conductive property, is made by covering the bottom of an ordinary glass with mercury and a wire leading to the same. *(Fig. 2.)* On the edge of the glass is suspended a strip of metallic zinc and the glass is filled with water acidulated with a few drops of hydrochloric acid. The positive pole of an electric current is connected to the zinc strip and the negative to the wire leading to the mercury. By this arrangement we are practically attempting to electroplate the mercury with zinc, but there being

Fig. 2



no affinity between the two, as where copper and mercury are used, the zinc is deposited upon the mercury in the form of a grayish flocculent powder. This is then removed, washed and dried, and later on mixed with the powder of the oxychlorid cement in about equal proportions.

The oxychlorid as it comes to us is also too rapid setting for root-canal work, but its setting time can be slowed down by adding borax to the liquid to the point of saturation. When set, oxychlorid does not perceptibly shrink and is impervious to moisture; and it is a permanent barrier to bacteria. We must not delude ourselves by presuming that the oxychlorid, however much it may be a germicide at the time of mixing and working into the pulp canal, is a permanent germicide of any decided strength after setting, for it is not. We are using it here principally because it makes non-shrinkable and electrical-conducting material and one which is acceptable to nature.

When this scheme was evolved, the writer had in mind the most thorough preparation and filling of the pulp canal in such a manner. that should an abscess develop in the future that the tooth and apical region could be quickly sterilized through the employment of electricity without the necessity of removing the root filling. Hence the use of electrically conducting oxychlorid to conduct to the dentin and the zinc cone to conduct to the apex.

The only point which may be open to question is whether the zinc cone being now purely an electrical conductor, having no special merit from the fact that it is zinc, (it might as well be copper or silver for our purpose, but zinc is used because it does not discolor the tooth), the question remains whether in the event of bacterial congress in the apical region in the future they can be killed by an electric current conducted in through the fixed cone. That is, the zinc cone if exposed in the cavity and the current applied, would it not have a bactericidal effect at the apex through some of the electrolytic phenomena as well today as twenty years ago? Let us also bear in mind that figuratively speaking, by reason of the large electrodes on the gum and the other on the metallic cone, we have an hour-glass in shape. The current largely passes through the apex of the root represented by the hole in the hour glass, in a concentrated form, so to speak, and it is just here where the infection starts, and it is just here where we want and happily find a concentrated effect of the current.

The time has been too short to report any cases of recurrent abscesses, for I have had none; but working upon the theory that if abscesses were cured twenty years ago by electric current passed through the apical region, the same thing can be done today and in the future with ease through the fixed zinc root filling.

THE TREATMENT OF PULPLESS TEETH; THE TECHNIC OF CLEANING AND FILLING CANALS*

BY J. P. BUCKLEY, Ph.G., D.D.S., CHICAGO, ILL.

IN THIS PAPER I desire to direct your attention to the treatment of pulpless teeth and give you the details of a method of cleaning and filling the canals which has proven successful in my practice. That you may judge for yourselves as to the result of the work, I will show by means of lantern slides radiographic findings before and after treatment. In the group of cases selected you will find almost every possible pathologic condition associated with pulpless teeth. In view of our present knowledge of focal infection and its relation to systemic disease, I consider the subject under consideration here one of the most important before our profession today.

While it is true, generally speaking, that pulps which are diseased beyond the condition of active hyperemia should be removed, it also is true that this organ has been destroyed far too ruthlessly in the past. The work of Roseneau, the observations of Hunter, Murphy, Billings, the Mayos, Crile, and others of the medical profession, and the investigations of Hartzell, Grieves, Rhein, Price, Gilmer, Logan, Moorehead, Black and others of our own profession, along the line of periapical infections and the systemic results, should teach us to conserve the healthy dental pulp in every case where it is practicable and consistent with good dentistry. Thousands upon thousands of normal pulps have been sacrificed for no other reason than that the dentin of the tooth was hypersensitive. When we think of the difficulty—not to mention the carelessness—under which these pulps often are removed, and of the frequent periapical infection resulting therefrom, we behold a sad spectacle, indeed. Such results should teach us that this practice must cease.

It is not my intention in this paper to discuss the methods in vogue of destroying the vitality of the dental pulp. It makes no difference to me how the pulp is destroyed so long as the results are satisfactory. In my own practice I use both pressure anesthesia and devitalization. In cases of pressure anesthesia, which is the method generally employed, where I know in advance that this operation is to be performed, I usually make one application of desensitizing paste which permits my reaching the organ without pain in those cases where there is a cavity, and of making a depression or cavity painlessly in those cases where no cavity exists. In this manner the desired end is accomplished with very little pressure and the less the pressure the better the results will be. I also desire to state that quite frequently I still use arsenic trioxid.

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*Read before the Ohio State Dental Society, at Cleveland, Dec. 1917.

Action of Arsenic Trioxid: At the present time there is considerable discussion in dental literature as to whether or not the effects of arsenic trioxid when applied to a dental pulp are self-limiting. Some men of high standing in the profession are of the opinion that the drug is too destructive an agent to be used for the purpose of pulp devitalization. It seems to the author that these opinions are not well founded when we consider the long clinical record of the drug as a devitalizing agent. It has been used since 1836. There can be no question regarding the harmful effects of the drug when injudiciously employed. Its action is not self-limiting. Its effects are produced only after the drug is absorbed by the tissue elements, altering or destroying their vital processes in an obscure manner. The reason why the drug may safely be employed in devitalizing the pulp of a fully-erupted tooth lies in the fact that here the effects are confined to the pulp tissue, since the organ dies by strangulation at the apex, due to the congestion caused by the drug when so used. Thrombosis and death of the pulp take place and, owing to the small foramina of the tooth-root, absorption of the drug by continuity of tissue is prevented. In those cases where the apices of the roots are not fully formed, the drug, if used at all, should be left sealed in the tooth for a short time only.

Diagnosis of Dead Pulps: It is not a difficult matter, as a rule, to differentiate between teeth containing living and deap pulps. The clinical history, the color of the tooth, its response or nonresponse to thermal or electrical stimuli, will lead us to suspect that the pulp is dead or alive. Now we are ready to confirm our diagnosis. One of the best means of confirming the diagnosis of a dead pulp is the use of electricity by an instrument known as the "vibrating coil." This consists of a dry cell and a vibrating coil with a switch to control the current. The cord leading from the positive pole is arranged with a holder so that a broach may be attached; cotton is wrapped around the broach and moistened when it is applied to the suspected tooth. The cord from the negative pole is attached to a metal holder, which is held by the hand of the patient; thus the circuit is completed. A stronger current may be had by moving the positive pole to the right on the instrument board, or by gradually withdrawing the cylinder which runs through the coil. One always should start with a weak current, gradually increasing the strength if no response is obtained. It is best to apply the current first to a tooth known to be vital, and use this as a control or guide. When two approximating teeth contain metal fillings, the current should be applied to the tooth so as not to come into contact with the filling of the adjoining tooth, which, if vital, would respond, leading one to believe that the tooth to which the current is applied is vital, when as a matter of fact, it may be pulpless.

After the diagnosis of a dead pulp has been confirmed, the pulp chamber should be opened freely with a suitable round or special pulp chamber bur. It is not enough here simply to determine whether the pulp is dead or alive; but, if dead, an effort should be made to determine the exact pathologic condition. These cases too frequently are treated by opening the pulp chamber and placing therein a pledget of cotton dipped in the most convenient remedy at hand, leaving the cavity unsealed for fear of causing septic pericementitis or an acute alveolar abscess, and making no effort to ascertain whether the invading germ is of the saprophytic variety, as usually is the case, causing pulp decomposition, with gaseous end-products, or whether the infection is caused by pyogenic micro-organisms, producing pus on the exposed surface, or, as sometimes occurs, within the substance of the tissue. It is highly essential, therefore, when a patient presents with an aching tooth that we take the time and trouble to determine not only whether we have a live or dead pulp with which to contend, but if the pulp is dead, whether the condition is a so-called septic pulp with pus formation (pulpal abscess) or one of true gangrene (putrescence). To confirm our diagnosis the tooth should be isolated and kept dry, preferably with the rubber dam, and a careful examination made. On no other basis can rational therapeutics be practiced.

Treatment of Pulpless Teeth: When a patient presents with a pulpless tooth, the original pulp tissue generally is in either a moist gangrenous condition, as a result of the action of saprophytic bacteria, or a previous attempt has been made to remove the pulp and fill the canals. In either case the first treatment here, in my opinion, should be a dressing of formocresol. Other preparations may be just as effective, but this is the one I have used for years and about which I can speak with assurance. Under aseptic precautions this remedy should be placed in the pulp chamber only, and the dressing retained with cement. This dressing should remain at least twenty-four hours, and in the interim a radiograph of the tooth and periapical area should be obtained. I know that many good men today advocate the immediate cleansing of a gangrenous canal, but I am firmly of the belief that the safest and best practice is to first apply at least one dressing of formocresol.

Some of our scientific investigators, notably Black and Price, have cautioned against the use of strongly-disinfectant drugs in the canals of teeth and have advocated the use of mildly-antiseptic remedies, whatever the condition may be. These precautions are timely where the use of such drugs is contraindicated; but if there is any place where strong disinfectant remedies may be used wisely and safely, it is in the canals of teeth containing the gangrenous remains of a dead and putrifying pulp. In clean and noninfected canals mildly-antiseptic drugs are indicated, or better yet, no drugs at all. We never should needlessly destroy tissue, but the temporary effect of strong disinfectant drugs on the periapical tissue is the least important consideration here. We must sterilize these infected canals and fill them in such a manner that sepsis will not recur, even at the possible expense of destroying some tissue in the periapical area. This accomplished, nature soon will repair the damage done; but if we fail in this respect, all our efforts are lost. It has taken the courage of Rhein, who has dared in the face of much unfair criticism, amounting in some instances to ridicule, with metallic sodium and potassium even to "burn" his way to and through the root-ends of pulpless teeth; it has taken the steady, quiet but persistent efforts of Callahan with his sulphuric acid to correct the erroneous impression that has been made upon the profession respecting the danger of strong disinfectants in the canals of pulpless teeth, without any qualification as to where such drugs could or could not be employed safely. All credit is due Rhein and Callahan for the better root-canal work that is being done today. These names stand out in bold relief and they continue to get brighter and brighter as the years go by and as the importance of thorough root-canal work is more appreciated by the profession. We need not agree in every detail with the methods and technic of these men; but we should unite as one man to honor them for the trail they have blazed and the great good they have accomplished.

I trust that I may be pardoned for my slight diversion here, and will now return to my subject. Hartzell, Gilmer, Moody and others have found that the predominating organism in the conditions resulting from a gangrenous pulp, therefore the group active in bringing about the decomposition, is a streptococcus. One initial treatment of formocresol in these cases, while it may not kill all the organisms present, certainly will lessen the number and lower the virulency of those remaining. Surely no one will deny the favorable and valuable effects of formaldehyd gas on the intermediate and end-products of pulp decomposition. With these poisonous and irritating products chemically neutralized, with the bacteria inaugurating the process killed or their virulency lowered, we may the more safely, I believe, work to the root-end, clean and enlarge the canal by a chemico-mechanical process. By this I mean the use of chemicals in connection with broaches, reamers, files and other necessary instruments. So far as I know, there are three chemical agents in general use for this purpose—metallic sodium and potassium, as advocated by Rhein; sulphuric acid (thirty per cent.) by Callahan; and phenolsulphonic acid (eighty per cent.) by myself.

In a paper which I read before the National meeting at Louisville, and which appeared in the March (1917) number of the *Journal of the*

National Dental Association, I discussed the chemistry of these agents, stating my reasons for not employing sodium and potassium, except in rare instances, and giving the advantages which, in my opinion, the acid method possesses over the alkali for the purpose under consideration. I also mentioned in this paper the advantages which phenolsulphonic acid has over plain sulphuric acid, and as I use the former almost entirely in my practice, I shall mention these advantages here.

Advantages of Phenolsulphonic Acid: The consistency of this agent is thick and syrupy, rather oleagineous in character, in the eighty per cent. strength which is recommended; thus a drop will adhere to the end of a broach or other applicator, permitting it to be carried even into the canals of upper teeth without difficulty. The acid does not materially affect a broach, and if any of it accidentally gets on the enamel of the crown of the tooth and is not noticed for a time, it does not decalcify and whiten the spot to the extent that sulphuric acid would do. When the acid is worked through the end of the root, as is desirable for cauterization in cases of a dental granuloma or alveolar abscess, it is sufficiently cauterant for the purpose desired, yet not as destructive as sulphuric acid would be; and owing to its analgesic tendencies, causes less pericementitis. In this connection, however, I want to say that we should not expect to do this work as it must be done without more or less soreness following the treatment. There is a wide variance in patients regarding the reaction of the periapical tissues to these agents, and in these chronic conditions it generally is best to invite and create inflammatory reaction that the sluggish cells in the area may take on new life and activity. This should not be done, however, at the expense of unnecessary destruction of tissue.

Technic of Using Acid Method: We now will consider the technic of treating pulpless teeth and preparing the canals for filling by the acid method. I take it to be thoroughly understood that good root-canal work means the use of the rubber dam in all cases, and the strict observance of asepsis. With me at this time, as heretofore, it means asepsis fortified by antiseptic precautions. I make this statement because it is so difficult to observe strict asepsis in our dental offices.

In a large percentage of cases of gangrenous pulps or imperfectly-filled canals, the radiograph will disclose a dark and suspicious area at the end of the root. With this evidence and under the conditions, we may properly diagnose the case as a dental granuloma or alveolar abscess. This growth may be nonpurulent or of the pus-discharging variety. It is recently only that these nonpurulent growths—true dental granulomas—have been recognized as such, and the treatment of such conditions in the past has not been as specifically emphasized as their significance merits.

Nonpurulent Variety: It makes no difference with me whether this growth is associated with a tooth, the canal of which contains a gangrenous pulp, *per se*, or an imperfect root-canal filling—the treatment is practically the same. At the first sitting when the diagnosis is made by the aid of a radiograph, or even before the latter is obtained, under aseptic precautions, the pulp chamber is opened into freely and a dressing of formocresol is hermetically sealed in and allowed to remain for two or three days. This treatment is for the purpose of neutralizing the gangrenous contents of the canal, or, in a measure, sterilizing the old root filling, as the case may be. In making an attempt to work one's way by chemico-mechanical means to and through the root-end without the previous application of some strong disinfectant, like formocresol, I have found that acute symptoms too frequently develop. This initial formocresol treatment prevents many of the acute symptoms which follow the immediate attempt to reach the root-end, however careful one may be. At the second sitting I want the radiograph; then with the rubber dam always in place and all necessary instruments sterilized, I carefully work to the apex with phenolsulphonic acid, using in connection therewith fine, smooth, twist and file broaches. This is what I call the chemico-mechanical process. Unless the canal is unusually small the work is begun with a fine twist broach—the kind which is rotated between the thumb and fore-finger. The pulp chamber is flooded with the acid by dipping the closed beaks of a pair of pliers into the liquid and carrying the same to the cavity; when the beaks are opened the acid is deposited. Before putting the pliers on the table the acid should be neutralized by dipping the beaks into a solution of sodium bicarbonate. This always should be done with every instrument used in connection with the acid, whether pliers, broach or other instrument. When I made the statement that phenolsulphonic acid did not materially affect instruments, I meant to have it understood that the acid on the instrument should be neutralized before laying it aside. One always should begin exploring the canal, even when known to be large, with a small broach. Where the twist broach may be used (which is in most cases) it serves me best. The gradual twist or auger movement carries the point forward and the grooves permit the acid to follow up or down the canal as one proceeds. This is another advantage which a liquid possesses over pastes or semi-solid substances. In this manner the end may be reached safely without danger of pushing the contents of the canal through the end of the root. In no instance should the broach be permitted to bind in the canal. Should this happen it either is too large or the canal is curved. To negotiate a curve, the broach should be curved to conform to the canal, as shown by the radiograph; then, with plenty of acid in the canal, it may be pushed gently past the curve and, in time, to the root-end. When the end is thus reached, a larger sized broach may be used; then still larger until one is able safely to use a barbed broach. When the canal is opened to the end, I like to use barbed broaches with a filing motion. This, with the acid, rapidly cleans and enlarges the canal. As the work progresses the acid is neutralized frequently with a solution of sodium bicarbonate, and since phenolsulphonic acid is the chemical I am using, I prefer not to have the alkaline solution more than ten per cent. in strength. The sodium bicarbonate solution not only chemically neutralizes the acid but the effervescence caused by the reaction aids materially in removing the "mushy" and disintegrated material from the canal. I now use the acid and neutralizing solution alternatingly in the canal several times. First I enter and go to the end with the acid carried on a cotton-wrapped broach; then the sodium bicarbonate solution is applied in the same manner, keeping up the alternating process five or six times. After I am satisfied that I am at the end of the root, that the acid is neutralized and the canal perfectly clean and sufficiently enlarged, then, if the radiograph has indicated a periapical involvement, with the acid and a small, stiff broach (the apexographer as a rule), I work my way through into the affected area. Some of the acid is purposely worked through the end for the express purpose of destroying the growth by cauterization. When this is done, the acid in the canal—not that which has passed through—is neutralized with the sodium bicarbonate solution, the canal desiccated with *modified alcohol* (seventy per cent. alcohol to which one gr. of thymol is added to the fl. oz.), and a dressing of eucalyptol compound (very little on the cotton) is sealed in the canal. This remedy is used here because it is a stimulating antiseptic, but it also aids in hermetically sealing the canal, which is done at this time by using a combination of a good grade of temporary stopping and cement. The heated stopping is placed immediately over the eucalyptol compound dressing and it adheres firmly to the walls of the cavity; the excess is removed and the remaining portion of the cavity filled with cement. This dressing is left for a period of from four days to a week when, if the case has progressed nicely, and pericementitis is absent, the canals are filled.

I desire to give a word of caution here in connection with this work which I never have heard mentioned, and that is to guard against making the opening through the cemental end of the root unnecessarily large. This is an important essential and must be observed if ultimate success is to crown our effort. I do not care how large the canal is through the dentin proper; I hope it is constricted as it passes through the cementum. In fully erupted teeth this usually is the case. As Noyes, Callahan and others have shown, there may be two or more of these small openings—multiple foramina, as they are called. Unless the root-end and apical tissues are involved to the extent of necessitating surgery after the canal treatment and filling, the smaller the opening through the cementum the more certain we can be regarding the success of our root-filling operation; and even where surgery is indicated, nothing is gained by having the opening unduly large. We never should lose sight of the fact that after the canal is opened it must be filled; and I repeat again, the larger the foramina the greater the hazard and the more uncertain will be the root-filling operation.

Purulent Variety: The treatment of an alveolar abscess of the purulent or discharging variety is practically the same as previously outlined except that in these cases there is not the danger of acute symptoms arising; therefore, one may safely, under aseptic precautions, work to and through the root-ends without the initial formocresol treatment. However, even here I believe it is the best practice to use formocresol first, but it is not so essential as in the case of nonpurulent growths. After we are through the end of the root it is best first to force a physiologic salt solution through the sinus, and if no sinus is present it generally is best to establish an opening through the overlying soft tissue and process, then cauterize the tract with some stimulating cauterant. Here also I use phenolsulphonic acid, full strength, as was used above for reasons mentioned. After this the treatment is the same as previously given for a dental granuloma. We never should lose sight of the fact that in all therapeutics we should work *with* and not *against* nature. If, in these cases, the root-end can be put and kept in such condition that the surrounding tissues can lie in physiologic contact with it, regeneration is effected; if this biologic condition cannot be brought about, all medication fails and surgery is the only road to success.

Pulps Partially Alive: In those cases where the pulp tissue is gangrenous in one or more canals of a multi-rooted tooth and alive in the other one or two canals, as the case may be, we will find much satisfaction in using the formocresol remedy. These are exceptional cases and it is difficult to know whether this condition exists until the second sitting. If there be much vitality in the live pulp tissue, the formaldehyd in the remedy doubtless will make the tooth ache, but after we know the condition our method of procedure is simple and the results will be certain. A small pledget of cotton dipped in the remedy can be placed gently over the mouths of the canals which contain gangrenous material, and a thin quick-setting cement flowed over the cotton. After the cement has set, the live pulp generally may be desensitized and removed with very little pain by gently working phenolsulphonic acid up and down the canal with a fine broach. Formerly these were difficult cases to treat, but with a remedy which can be sealed hermetically in a gangrenous canal, the procedure is materially simplified.

Pulpal Abscess: It was mentioned previously that one may open occasionally into a suspected tooth having all the symptoms of a dead pulp, and find a drop of pus in the bulbous portion of the pulp chamber with the remaining portion still alive. Some writers call this condition a septic pulp or pulpal abscess in contradistinction to gangrene or true putrescence (presence of gases). In such a case any remedy containing formaldehyd may cause the tooth to ache; therefore this must be taken into consideration and in the treatment of so-called septic pulps the pus should be washed out of the cavity with a warm antiseptic solution, the cavity dried and asepsis established by hermetically sealing in a much smaller amount of formocresol than that generally used in cases of true gangrene. If this precaution is taken the tooth will not ache long, even in cases where no odor is present and the vital tissue still is quite sensitive. This remedy will sterilize the tissue, after which, at the second sitting, the pulp can be anesthetized or devitalized as usual.

Removing Old Root Fillings: In those cases where a previous attempt has been made to fill the canal with gutta percha, it is necessary, after the initial formocresol treatment, to remove first the old root filling. Generally in these cases there is only one cone in each canal, in which event the acid soon will work its way quickly around the cone, when it may be loosened with a suitable instrument and removed in one piece. However, occasionally it becomes necessary to remove a filling where the gutta percha has been packed firmly in the canal. Here the use of xylol, or xylene, as it also is called, will aid materially in disintegrating the gutta percha. This is dimethylbenzene, and while the agent does not dissolve the gutta percha in the sense that chloroform would, it readily attacks and disintegrates the material, making its removal comparatively easy after a few minutes.

Removing Blockade in Canal: We never should use any drug or chemical blindly. Therefore, if in working up or down a canal we find it blocked and are unable to reach the end, instead of going on blindly using only one chemical, whatever it may be, and running the risk of making a false pocket, we should stop and ascertain, if possible, and it generally is possible, the nature and character of the material causing the blockade. It may be only a curved root; it may be a remnant of an old gutta-percha cone; it may be pulp tissue undecomposed which has been packed inadvertently in the canal; it may be some inorganic material, such as a pulp nodule, secondary dentin or other loosened inorganic material which has been pushed into the canal. If we discover a curved root our broach should be curved accordingly; if we have reasons for concluding that an old gutta-percha filling is causing the blockade, xylol is the chemical to use; if we think it is organic material, the alkalies, like sodium and potassium or a strong solution of one of the hydroxids of these metals, is indicated; if inorganic material, phenolsulphonic acid or sulphuric acid will best answer our purpose. My plea is not to become wedded to any one chemical or method. Be eclectic and take the necessary time to do this work carefully and well. It is the most important work you have to do.

Filling the Canals: We now have treated these various conditions associated with pulpless teeth, the canals have been cleaned and enlarged and the tooth-structure sterilized. There remains one essential thing yet to be done in the field of therapeutics before turning the patient over to the operative dentist, and that is so to fill the canals that *sepsis never may recur.* There has been a great variance of opinion in the past regarding the methods and materials used for filling root canals. The method employed in this operation depends largely upon the material which the individual operator uses, and a great variety of materials have been suggested and used, among which the following may be mentioned: Medicated cotton, medicated pastes, zinc oxychlorid cement, paraffin and gutta percha.

In the light of our knowledge today of focal infection it would be fortunate indeed if it could be correctly stated that all of the materials above mentioned, except gutta percha, had been discarded; for all, with the one exception, have been tried and found wanting. The radiograph has proven the correctness of this statement. In the opinion of the author, which is shared by men like Rhein, Black, Callahan and others, gutta percha modified and used in such a manner as best to meet the needs of the individual operator is the only material at our command today upon which reliance may be placed. From experiments made, Price is even skeptical regarding gutta percha on account of its inherent tendency to shrink; but against his laboratory experiments stands the record of thousands of clinical cases which proves conclusively that this material properly used answers our every purpose for filling the canals of pulpless teeth. This being true, the proposition resolves itself into the problem of determining the best method of modifying and using the material.

We may modify the properties of gutta percha by incorporating within its substance certain drugs; and drugs are added to root-filling materials for two purposes: One, a *pharmaco-mechanical* reason; the other on a *therapeutic basis.* In the case of gutta percha, it is admissible to add to and use in connection with the material such drugs as chloroform and eucalyptol for pharmacal and mechanical purposes. In the opinion of Callahan, even rosin may be added on this basis. The solvents, chloroform and eucalyptol, soften the material which permits its adaptation, by proper manipulation with heat and instruments, to every irregularity in the canal which has been cleaned and opened by the previous treatment—thus the latter is completely filled with a nonabsorbable and, if properly manipulated, I believe, nonshrinkable material.

Whether or not we are justified in adding drugs to root-filling materials today for therapeutic purposes is a debatable question. Speaking of the use of the many so-called "permanently antiseptic" root-filling pastes of various kinds that have been advocated and used, Best says: "The only possible excuse I can see for the use of these preparations in the roots of teeth is that the operator knows that he has left something in the root which he should not have left, and instead of removing it he places his 'life-saver' in on top of it and then rests assured he 'will have no further trouble' from it in the future." When we remember that to which the author has repeatedly directed attention, viz., there is no such thing as a permanently-antiseptic root-filling material, we cannot rightfully have this satisfying assurance. That gutta percha aseptically introduced in an aseptic canal will remain aseptic for years is the firm belief of the author and others, based upon years of clinical experience and observation. We have no right to fill a canal of a tooth which requires an antiseptic, as such, in our filling material. Referring again to Best, he makes the statement "that the only solution lies in an almost entire nondependence upon antiseptics in canal fillings and in the maintaining of asepsis in the operation." I fully agree with the first part of the statement that we should not depend upon antiseptics as such in our root-filling material; but I firmly believe in the liberal and generous use of antiseptics, and in the careful and intelligent use of disinfectants in establishing and maintaining asepsis in treating pulpless teeth and preparing the canals for filling.

Maintaining Asepsis: The responsibility of having all instruments and material used in dental surgery sterile, *where it is possible to cause an infection through an open wound or otherwise,* is rightfully thrown upon the dentist; and in assuming this responsibility he should study carefully the various methods of sterilization, and exercise judgment in his application of the principles involved. Therefore, in the filling of root canals the rubber dam always should be adjusted, and the teeth included sterilized, *for asepsis must be established and maintained.* In our work up to this point we have been using antiseptics and disinfectants—thus fortifying our asepsis. But now we should depend only on absolute measures. The canals should be aseptic before the operation is attempted. If there is any doubt in this regard the operation should be deferred until they are in such a condition. Not only should the canals be sterile, but all instruments and material used should be germ-free. Such instruments as will not be thus injured may be sterilized by the *direct application of heat* from the flame of a Bunsen burner or lamp by holding them in the flame, or playing the latter over them a few times. Other instruments may be sterilized by *moist heat,* as hot water or live steam. Cotton wrapped on broaches, absorbent points, and such other necessary material mey be sterilized by *dry heat.* To sterilize the gutta-percha points it is necessary to rely upon *chemic agents.* These may be sterilized when first purchased by immersion for a few hours in modified alcohol or other suitable disinfecting solutions, when they are removed and placed on sterile gauze to absorb the liquid, then dried and put in gelatin capsules, Petri dishes or other sterile containers. Even with this method of keeping the points, it is well to place the selected ones in modified alcohol a few minutes before they are used. Though it may be done, it is impracticable to sterilize the hands and keep them germ-free throughout the operation; and it is not necessary to have them absolutely sterile if the cotton on the broaches was sterilized by dry heat after being wrapped, as first suggested by Best. This is the safest practice.

Technic with Large Canals: If the author's suggestion has been followed in regard to using eucalyptol compound for the final dressing in treating pulpless teeth, the canal generally will be in condition to fill, so far as moisture is concerned, when the dressing is removed. Black states that "moisture is effectively removed by flooding the canals previous to filling with eucalyptol or oil of cajuput. The oils have a greater affinity or attraction for the dentin than has the moisture; therefore, displace it." If testing with sterile cotton on an absorbent point indicates moisture in the apical end, it should be absorbed before attempting to fill the canal. Over-drying with heated air or instruments should be avoided.

With these large canals, especially those in connection with which dental granulomas or alveolar abscesses have been treated, where the apex is large and where we ought not to expect to get a response from the patient when the gutta percha reaches the apex, on account of the loss of tissue in the periapical area, it is best before filling to measure the canal and then use one cone which approximately fits it rather than to use two or more smaller cones with the possibility of unnecessarily forcing one through the apex and into the periapical area. To measure the canals, absorbent points may be used. When, after repeated trials, we find a point which fits the canal, a cone should be selected which is slightly larger than the measuring point. The canal now should be moistened with chloroform, carried to place by the long beaks of a pair of pliers, then a small amount of eucapercha introduced, the latter being worked up or down into the canal with a fine smooth broach, exhausting the air. This accomplished, the selected cone, flattened on the large end, should be held in chloroform for about thirty seconds and placed in the canal, when it should be worked up and down a few times with a slight pumping motion. In this manner the chloroform and eucapercha soften the outer surface of the cone, leaving the central portion with sufficient resistance to cause the mass of gutta percha to spread laterally as the cone is finally pressed to place with the pliers. Root-canal pluggers now may be used and the mass of gutta percha firmly packed in the canal. If chloroform is used, very little heat is required to soften the cones. The final packing may be done with a tampon of cotton or Japanese bibulous paper, saturated with chloroform, as suggested by Rhein. In filling large canals from which live pulps recently have been removed, the patient generally will flinch before the cone reaches the apex. When this occurs, we should wait a few moments, when the cone can be pressed gently much farther without causing the patient to flinch a second time. If these precautions are observed they will be the means of preventing much of the pericementitis following the filling of root canals.

In these cases we should make every endeavor to have our sterile root filling reach at least to the end of the root; and Rhein repeatedly has emphasized the necessity of encapsulating the apical end of the root with the fluid gutta percha in all cases where gangrenous canals have been treated which in any way involved the periapical tissues. The author believes the future will prove this to be necessary in cases where dead and infected pulps have been treated. In clean cases it is not necessary for the filling material to protrude beyond the apex. In my opinion it is sufficient if it reaches the junction of the dentin and cementum, though it is difficult to fill canals as they must be filled for success without having the material pass through the apex to a greater or less extent. Fortunately, the tissues take kindly to sterile gutta percha. However true this may be, I do not want more of the material to go through than enough to guarantee the thorough filling of the opening and the encapsulation of the root-end. With a small opening this is accomplished easily; with a large one it is not. As yet I do not know the fate of a large mass of gutta percha protruding through the root-ends of teeth and occupying a portion of the area absorbed by the necrotic process. I have some of these cases in my practice now under observation, where it was impossible to fill the canal as it must be filled without pushing the root-filling material through into the apical area farther than I should like to have done. I will report on these cases later when time and the radiograph will have shown the results.

Technic with Small Canals: In filling all canals where we can enter nicely with a small canal plugger, it is best to follow the technic previously given, using a cone which will enter the canal. However much we may regret it, there are canals so small and tortuous that only a fine, smooth broach will enter, at least to any depth. It is useless to try to fill such canals with a gutta-percha cone. The various methods of enlarging the canals by the use of acids and alkalies can be employed, but it is not always advisable to enlarge them sufficiently to admit a cone of any appreciable size, and there is no resistance to a very small cone, especially after it has been softened with solvents or heat. After the larger canal or canals in a multi-rooted tooth are filled in the ordinary manner, the smaller ones can be moistened with chloroform and eucapercha and the solution worked up or down into the canal. This process should be kept up for some time until the chloroform evaporates, leaving the gutta percha rather thick and quite plastic. The sides of the pulp chamber now can be moistened with eucalyptol compound and a piece of base-plate gutta percha, selected and softened in the flame, can be packed into the pulp chamber, when pressure is made toward the small canals and the plastic gutta percha forced into them. This is much better practice than simply filling the mouth of the canal with a gutta-percha cone, leaving the rest of the canal empty. It will make no better root-canal filling, but you may be better satisfied with your subsequent radiographic findings if, in these cases, you add some barium sulphate or bismuth subnitrate to the eucapercha before introducing it in the canal.

If the canal is so small and tortuous that even a small broach will not enter, and if it cannot be enlarged by the use of acids or alkalies, it will be necessary to either extract the tooth or record the fact and occasionally check up on the case with a radiograph to ascertain if any infection is present at the end of the root. In every case where it can be done, the gutta percha in the canals should be protected by zinc oxychlorid cement. This may be done in all cases except those where it is subsequently necessary to insert a post in the canal for some purpose.

The technic of filling root canals with gutta percha, as described by different operators, varies slightly, as, for instance, in the drugs used as solvents and in the manner of introducing and packing the material in the canal. Some operators believe they can get a more compact mass of gutta percha in the canal by cutting the points and introducing them in small pieces. Whatever method is employed, the gutta percha must be left firmly packed in the canal, and it is the duty of every dentist to use this material in filling root canals according to the method which offers the greatest opportunity for success in his hands.

The operation is one that requires attention to detail and, while the author does not believe it necessary to radiograph every root filling, a sufficient number should be radiographed until the operator is satisfied he has mastered the technic of the method employed. All difficult cases and questionable root fillings should be radiographed. In treating pulpless teeth, preparing the canals for filling, and in the root-filling operation, the dentist always should try to do his best; and it is well to remember here that we fail with the problems of life only when we lose confidence in our ability to succeed.

In recent years much has been written about the health value of removing focal infection. This is all important, but I wish to state, with all the emphasis at my command, that the majority by far of teeth thus involved may be therapeutically or surgically treated so that they will not be a menace to the health of the individual. Physicians and dentists should work together and in harmony on this proposition. The former should not advise the extraction of teeth without first consulting the latter. When focal infection is found or suspected in the mouth by the medical practitioner, his plain duty lies in referring the patient back to the family dentist with such suggestions as he may deem advisable in the case; and the dentist's duty lies in removing the *focus of infection* by treatment or extraction. The members of the two professions should work together harmoniously for the benefit of the patient's health, which, I am happy to say, is being done today.

"Honor and shame from no condition rise;
Act well your part—there all the honor lies."

OUR NEXT STEP—ADVANCE OR RETREAT?*

BY L. P. BETHEL, M. D., D. D. S., COLUMBUS, OHIO.

AS WE LOOK BACK a few years and trace the progress of dentistry, we are impressed with its great development. Yet, great as it has been, it seems to be but a beginning of what must come. The greatest knowledge, ingenuity and skill of our dentists will be tested by the problems and obligations of the new era that has dawned for the dental profession.

In the past, dentists were looked upon as mere mechanics, especially by the medical profession; and it was not until dental science was so developed that it began to overlap medicine, that the medical profession awoke to the realization of what dentistry really means to the welfare of the human race; and to what it often means to the success of their own operations and treatment.

Some time ago Surgeon A. M. Fauntleroy, of the U. S. Navy, made a report on the "Medico-Military Aspects of the European War." In this report the author referred to the commendable work that the dental surgeons were doing in the hospitals, and he mentioned particularly that done in the dental department of the American Ambulance in Paris. Among other things he said:

> "One of the surgical advances of the present war has been the recognition of the dentist as a necessary unit in the organization of a military hospital. So valuable has this work become that every large military hospital now has its surgical dental department, which works in conjunction with the other surgical services and supplements certain procedures which are indispensable as regards bringing about a favorable result."

After enumerating many operations performed by the dental surgeons he continues:

> "There can be no question of the value of placing the teeth in order, as shown by improved digestion and general good health following this work; but

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* Read before the Mid-Winter meeting of the Rehwinkel Dental Society and the Eighty-third Division Dental Society, U. S. N. A., at Camp Sherman, Ohio, February, 1918.

the great usefulness of a dental department to every hospital only recently has been generally recognized.

In many instances the complications following operations are directly traceable to an unhealthy condition of the mouth. So true is this that the careful surgeon is beginning to insist upon a thorough inspection and treatment of the teeth, whenever it is practicable, before undertaking any major operative procedure."

The work of the Army Dental Surgeon has been a great factor in bringing about the recognition, by medical men, of the real value of dentistry. Civilian dentists, as well, are receiving attention from the medical profession.

There are few first-class general hospitals of the present day but have dental departments for the performing of services that tend to ameliorate post-operative infections, and that mean so much to the improvement of health conditions of patients in general.

And the recognition is not confined to this country alone. A few weeks ago, over in England, members of the General Council of Medical Education and Registration, asked: "That steps be taken to promote legislation to secure the election of direct representatives of registered dentists upon the General Medical Council." In the discussion of this one member said: "I always have regarded it as a great misfortune that the practice of dentistry, or the profession of dentistry, ever was separated from the general practice of medicine or surgery. There was even less reason for it than to establish a separate profession of ophthalmology or of aural surgery or any other specialty."

Today we have dentists who can treat fractures of the jaws much more skillfully than can the general surgeon. Orthodontists can, by operative procedure on the jaws, straighten deflected nasal septa and develop the nasal cavities of young subjects, and even antral cavities, to an extent that nose and throat specialists never have been able to do. Our army dental surgeons are making more complete mutilated-face restorations than army medical surgeons have been able to do alone. Our dentists through operative and hygienic measures in the mouth, are doing a preventive work that physicians have not been able to do for the health of individuals. And these are but a few of the great things that the dentist will be able to perform for humanity. As we advance, new opportunities will unfold.

Shall we retreat?

The history of the development of dentistry for the next five years, if well recorded, will be surprising. And right here let me say that if the war continues for some time, the work of the Army Oral Surgeon is going to aid materially in making this history.

I want to ask the army oral surgeons to keep a full record, apart from the army record, with illustrations where possible, *of all operations of note, that these may later be published and show the world what dentists in the army have accomplished.*

In *The British Dental Journal* of January 1st, 1918, there is an article entitled, "The Relationship of Dental Infections to Ocular Diseases," by J. J. Evans, Fellow of the Royal College of Surgeons, Birmingham, England, from which I will quote a few paragraphs as follows:

> "For something like a quarter of a century we have had a dental surgeon on the staff of the Eye Hospital. I cannot tell you definitely what objects the medical staff had in view when they got the appointment made—probably it was largely in order to relieve the house surgeon of the duty of extracting teeth for the patients and staff and to give the latter the opportunity of having that somewhat unpleasant operation done efficiently. Be that as it may there can be no doubt but that the services of the dental surgeon at the Eye Hospital have, within the last few years, increased in amount and importance much beyond what was ever anticipated by those who originally instituted the appointment. I think it will be of some interest, and perhaps instructive to the ophthalmologist, as well as to the dental surgeon, if we inquire into the reason of this somewhat sudden accession of dental work in connection with an eye hospital, and try and estimate the benefits to the patients and advancement of knowledge which have accrued from the co-operation of the two professions.
>
> As to the cause of the increase in the dental consultations a large amount of it is due to altered attitude of the modern ophthalmic surgeon towards certain ocular diseases of ill-defined origin. This is particularly the case with regard to inflammatory diseases which used to be called 'rheumatic' or 'gouty.' At the present time to talk about any disease being 'rheumatic' is practically a confession of ignorance, or an admission of carelessness or neglect in rooting out the septic focus which is the cause of the 'rheumatism.' In common with many physicians and surgeons ophthalmologists have been searching for these septic foci, and the mouth has obviously appeared to be the place to look at first, and we must admit it has seldom failed to supply the desired septic focus. Unfortunately, we ophthalmologists have found ourselves so overwhelmed with the septic lesions that we have found it necessary to call to our aid the dental surgeon in order to decide whether all of them are equally productive of systemic diseases and, if not, which may be regarded as dangerous, and which benign. This will give you some idea of the busy time we give our dental surgeon.
>
> "It is hardly necessary nor desirable to specify all the eye diseases which have been attributed by some one or other to dental lesions, but many oculists regard certain of the following as often arising from endogenous infections from the teeth:—
>
> (a) Inflammation of the conjunctiva, cornea, or sclera.
> (b) Iritis and Iridocyclitis, particularly the 'rheumatic' form.
> (c) Choroiditis, and possibly secondary detachment of the retina.
> (d) Retinitis and optic neuritis (generally the retro-bulbar form).
> (e) Post-operative infections, usually an iridocyclitis."

I am wondering how many of our dentists would feel prepared for consultation with an oculist regarding these affections, and be able to establish the existence of a dental lesion and to trace the relationship of this lesion to the affected eyes.

Yet medical practitioners expect assistance from dentists in diagnosis and treatment of many and varied obscure pathological conditions. This is shown by the many cases that they are referring to dentists, and especially since oral focal infections seem to play such an important role in many systemic ailments.

We can but admit that oral focal infection has brought new problems to the dental profession. But will the dentists solve them?

Why not?

It is true that some dentists have become discouraged at being unable thoroughly to diagnose certain dental and oral lesions and eradicate the cause of infections by treatment, and through the impression that every devitalized tooth is a source of infection, and that successful root-canal filling is almost impossible. Because such dentists may have resorted to extraction of teeth as a remedy, is no excuse for dentists generally to thus beat a retreat and carry dentistry back to the days of our forefathers.

It would show greater valor if these dentists would fit themselves better, medically, surgically, dentally, and make an attempt to master these conditions. By so doing they would greatly increase the small army of faithful experimenters and investigators who are giving their time and energies, without thought of personal sacrifice, to the study and cure of these lesions.

Standing as we do today on the threshold of one of the greatest developmental periods dentistry ever has known, and with an army of earnest dentists working together for the solution of these problems, good results must accrue. The task may be slow, but a final accomplishment is possible.

Today we are in the lime-light. The dental profession is being watched from every angle; members of the medical profession are watching us; members of the Army Medical Corps are watching us; the eyes of the world are upon us. There is but one thing to do—we must advance. Retreat? Never!

FRACTURES AND DISLOCATIONS OF THE JAWS*

BY CHALMERS J. LYONS, D.D.SC., ANN ARBOR, MICH.
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PROGNOSIS

THE PROGNOSIS in fractures of the jaw must vary greatly according to the location of the fracture, the character of it, and the complications which are present or which follow. The age and the resistance of the patient always will be predominating factors which will influence a favorable or unfavorable prognosis. The time which elapses between the injury and the reduction of the fracture also will influence the prognosis. The prognosis should have reference to several points, viz., the effect of the injury in respect to the favorable or unfavorable termination of the case, its simple or complicated course, the influence of each complication, the time required for recovery, and lastly, the result as to normal occlusion of the teeth and normal function of the jaws.

Age has a considerable influence in affecting the prognosis. The younger the patient the better the prognosis, because in the young, fractures unite more easily and promptly than in the adult. As an example, thirty days are required for repair of simple fracture of the mandible in an adult; in a child fifteen or twenty days will suffice.

The lowering of the vitality through chronic alcoholism or disease likewise will have its influence in delaying repair of fracture. Such chronic diseases as syphilis and tuberculosis lead to a state of constitutional dyscrasia which always delays union and may prevent it entirely.

In a patient afflicted with any acute disease, the process of repair may be expected to be considerably retarded. If the fracture has existed two or three weeks previous to the reduction, and there is considerable movement of the fragments, consolidation will not take place as rapidly after the parts have been brought into normal relation as it will if reduction is made at the time of the injury.

The presence or absence of infection in fractures of the jaws plays an important role in the duration of the treatment. The development of dento-alveolar abscesses, as a result of devitalization of teeth through the injury, may prolong the process of repair by pus burrowing along the path of least resistance and discharging in the interstice between the fragments.

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INDIVIDUAL TYPES OF FRACTURE

In the preceding chapters we have considered some of the points in general in prognosis, especially those relating to the causes of delayed union and non-union, and now we will consider the prognosis of individual types of fracture.

In a simple fracture of the mandible where the fragments remain or are replaced in perfect contact, repair will take place in from twenty to thirty days without untoward symptoms, without deformity or malocclusion, and without any detriment to the function of the jaws.

If in a simple fracture the fragments remain nearly in apposition although not perfectly so, the prognosis will be almost as favorable, although it will take somewhat longer time for repair to take place, and there may be slight deformity manifest, principally in malocclusion of the teeth.

All compound, comminuted and complicated fractures, which in their very nature present additional obstacles in the way of complete reduction, may not present as favorable prognosis. It may be stated that while the efficiency of proper retaining splints should not be sacrificed for simplicity, yet the more simple the splints are in construction the more favorable will be the prognosis.

In fractures of the superior maxillæ, the fragments will not be subjected to muscle-strain as in those of the lower jaw, and the retention of them in normal position will not be so complicated.

Fracture of the condyle with displacement offers less in the way of favorable prognosis than any other fracture of the lower jaw. This is due to the fact that the injury responsible for the fracture usually will produce a traumatism in the temporo-mandibular joint which may result later in ankylosis. This may be temporary or permanent.

Gunshot fractures of the jaws which are necessarily in most cases compound and comminuted, are in a much less degree amenable to treatment than most other fractures. The splints for supporting the fragments must necessarily be more complicated, and infection always is present. A certain proportion of these demand, for the purpose of obtaining the best results, a definite course of treatment, having in view the control of the infection as the primary consideration, and the relief of the deformity by means of splints as the secondary consideration. In most cases, however, both are to be regarded as necessary indications of treatment.

Pain and tenderness and partial loss of function of the jaws is a common sequelæ in fractures of the jaws. This may last for several weeks and possibly a few months. This is not to be regarded as a serious complication, for in time the jaws will resume their normal condition and function, if successful reduction of the fracture has been accomplished.

In summarizing, then, to form a judicious prognosis in fractures of the jaws, the operator must take into consideration the age of the patient, the state of strength or debility, of health or sickness, the presence or absence of infection, the location of the fracture; its nature, its recent or ancient date, its complications and the plan of treatment pursued.

TREATMENT OF FRACTURES OF THE JAWS

The treatment of fractures of the jaws consists, generally speaking, in the fulfillment of three principal indications:

First—To reduce the broken fragments.

Second—To retain them in normal position until consolidation has taken place.

Third—To prevent or control inflammatory processes.

A thorough knowledge of the function of a bone and of the muscles which affect it is indispensable when judging of its injuries. There are no fractures in the human body where muscle-strain plays a more important part in displacement of the fragments than in fractures of the inferior maxillæ.

We will now consider the influence of muscle-strain in displacement of the fragments in fractures of the mandible.

The movements of the inferior maxillæ are controlled by the following muscles: *temporalis, masseter, pterygoideus externus* and *pterygoideus internus*, which are situated in the posterior portion of the inferior maxillæ and are the elevators of the jaw. Then there are the *digastricus, mylohyoideus, geniohyoideus*, which are situated in the anterior portion of the inferior maxillæ and are the depressors of the lower jaw. In order to understand the influence of the action of these muscles in displacement of the fragments and its consequent importance in the selection of the treatment to be pursued in fractures of the mandible, it will be necessary to review briefly the origin, insertion and function of these muscles.

The *temporalis* is a broad, strong muscle, rather flat, which covers the planum temporale and the temporal fossa, and is inserted into the inner surface, apex and anterior border of the coronoid process of the inferior maxillæ. Its action is to aid in closing the mouth by pulling the points of its insertion upward and backward. While a fracture of the coronoid process is rare, yet in such a fracture the fragments would be pulled apart by the action of this muscle. (*Fig. 24.*)

The *masseter* is a thick, strong muscle, which has its origin from the inner and lower border of the anterior and middle third of the zygoma. It is inserted into the angle of the jaw and adjacent portions of the body and of the ramus. This muscle being very large and strong is able to close the lower jaw with great force. (*Fig. 25.*)

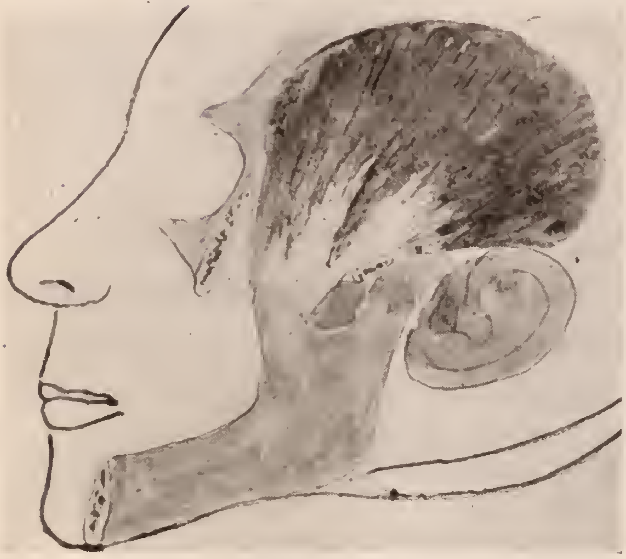

Fig. 24

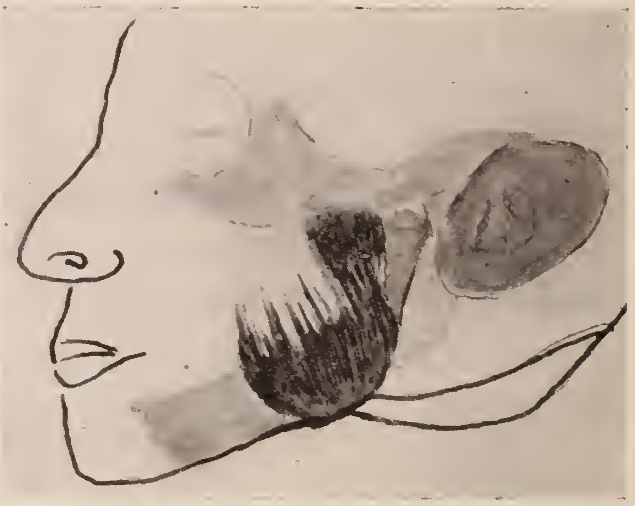

Fig. 25

The *pterygoideus internus* acts in conjunction with the masseter in elevating the lower jaw against the upper. It has its origin in the pterygoid fossa of the sphenoid bone, and is inserted on the inner surface of the angle of the jaw just opposite the insertion of the masseter. This muscle, in conjunction with the *temporalis* pulls the posterior fragment upward and inward in fracture of the inferior maxillæ in the region of the molar teeth. (*Fig. 26.*)

The *pterygoideus externus* (*Fig. 26*) is a fairly strong muscle situated in the infra-temporal fossa between the *temporalis* and the *pterygoideus internus.* Its origin is by two or more separate heads: the larger from the outer plate of the pterygoid process of the palate bone and from the tuberosity of the superior maxillæ; the smaller one from the infra-orbital crest of the greater wing of the sphenoid bone. These two heads become united, and the muscle becomes smaller and is inserted by a short tendon into the pterygoid fossa of the head of the mandible.* "This muscle draws the condyle of the mandible and the articular disk forward upon the articular eminence; when the muscle of one side acts alone it draws forward the mandibular condyle to which it is attached, the other one pivoting in the mandibular fossa and the result being an apparently lateral movement of the mandible." It is this muscle that controls the upper end of the ramus of the jaw while the *masseter* and *pterygoideus internus* control the lower portion.

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*Sobotta-McMurrich.

In dislocations of the jaws it is this muscle in conjunction with the *temporalis* which holds the jaw in front of the articular eminence and prevents it slipping back into normal position.

In fractures of the jaw it is the *pterygoideus externus* of the opposite side which pulls the mandible forward, giving it a twisted appearance, thus separating and holding the fragments apart.

We now have considered the influence of the muscles of the posterior portion of the inferior maxillæ or the elevators of the lower jaw. Next we will study the depressors of the jaw, or those muscles in the anterior portion.

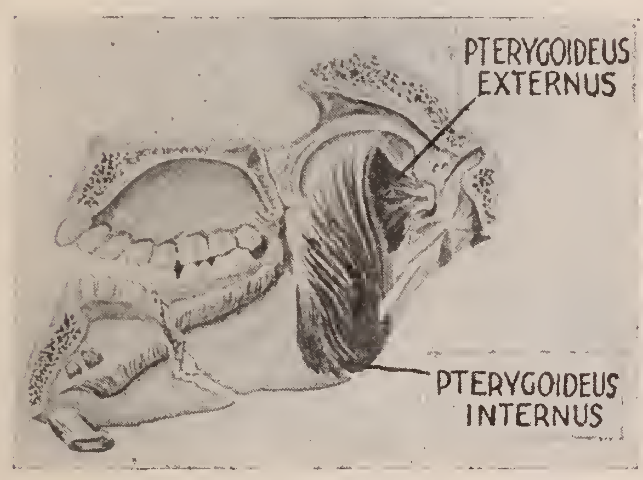

Fig. 26

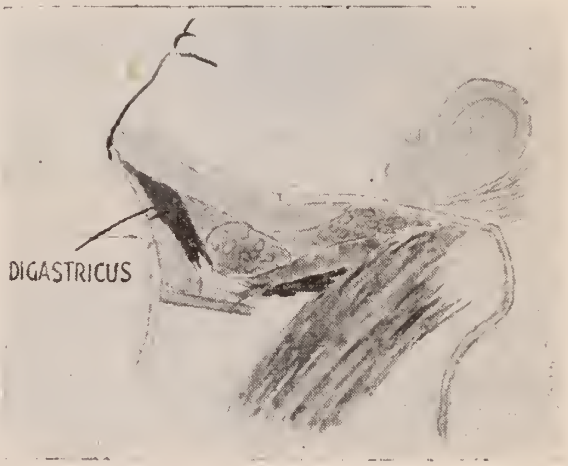

Fig. 27

The *digastricus* is a two-bellied muscle. The function of the posterior belly is to aid the *stylohyoid* and *infra-hyoid* muscles in fixing the hyoid bone and secondarily influences the movements of the mandible in opening the jaws. The anterior belly of the *digastricus* is a thick heavy muscle which passes from the intermediate tendon which is attached to the hyoid bone to the digastric fossa of the mandible. Its action is to depress the lower jaw. (*Fig. 27.*)

The *mylohyoideus* is a broad and flat muscle which is situated in the sub-mental and sub-maxillary regions, and is partly covered by the anterior belly of the *digastricus.* The two muscles of opposite sides unite in the median line and form a muscular layer which extends across the mandibular arch and constitutes the floor of the mouth. Each muscle has its origin in the mylo-hyoid line of the mandible, and runs obliquely to the median raphæ, and some of the fibres are inserted into the upper border of the hyoid bone. Its action is to aid in deglutition and assist the *digastricus* in depressing the lower jaw. (*Fig. 28.*)

The *genio-hyoideus* is a strong, flattened muscle, which has its origin from the mental spine of the mandible, and is inserted in the anterior border and upper surface of the hyoid bone. (*Fig. 28.*) Its action is to depress the lower jaw when the hyoid bone is fixed. In cases of fracture of the anterior portion of the mandible with loss of substance, the action of the *mylohyoideus* muscles tend to draw the two sides of the mandible together. In case of multiple fracture of the mandible from above downward and backward, the depressors will draw the fragments to which they are attached downward and forward, and the elevators will draw the remaining fragments upward and backward, causing a marked displacement. (*Figs. 29-30.*)

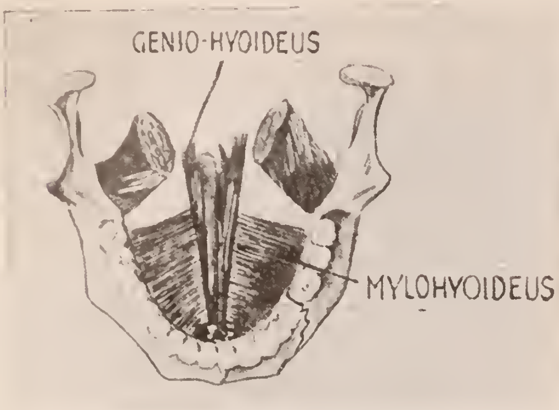

Fig. 28

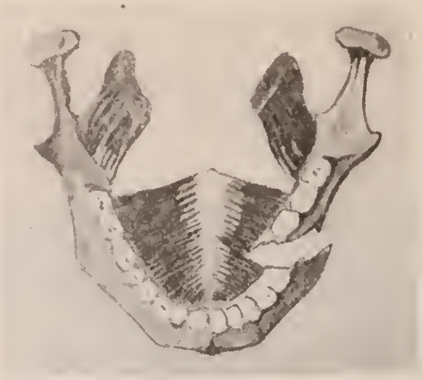

Fig. 29

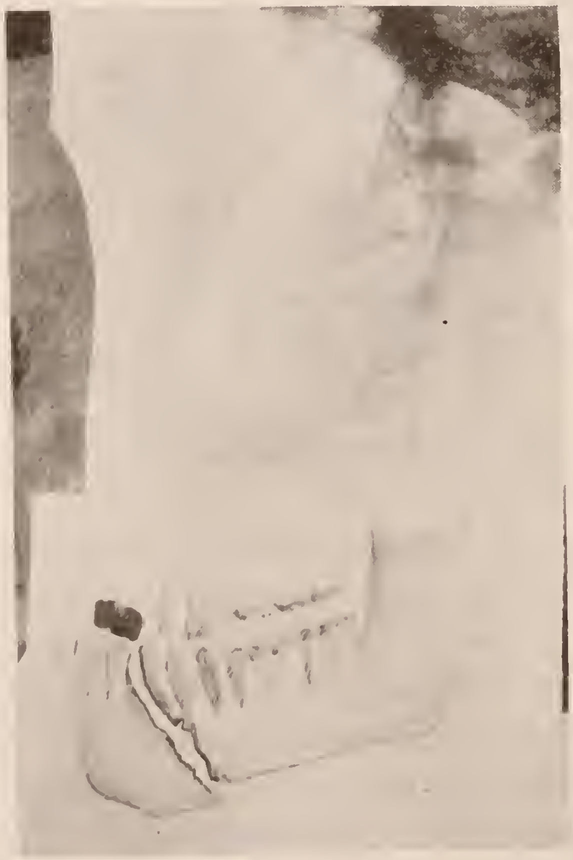

Fig 30

In a single unilateral fracture the same condition will be present, only the displacement will not be so marked on account of the support of the structures of the opposite side of the jaw to the long fragment.

When the line of fracture is oblique and from above downward and forward, (*Fig. 28*) the displacement will not be so great, for the action of elevators and depressors opposing each other will have a tendency to pull the fragments together rather than apart. In fact, in a unilateral fracture of this kind, the line of fracture may be hard to detect on account of little or no displacement.

In fractures of the inferior maxillæ the displacement may be not only from above downward, but the line of fracture may run from the buccal to lingual and backward, or buccal to lingual and forward.

When the line of fracture is from buccal to lingual and forward, there will be considerable displacement of the parts. The action of the *mylohyoideus* will depress the end of the short fragment, while the *pterygoideus internus* will tend to rotate the short fragment outward, and the *pterygoideus externus* of the opposite side will move the long fragment forward. (*Fig. 29.*)

When the line of fracture is from without inward and backward, the displacement will not be so great as when the action of the muscles oppose each other, and the only displacement will be in the long fragment being moved forward by the action of the *pterygoideus externus.*

In oblique fractures at the symphysis, if the superior genial tubercle is left on one fragment and the inferior genial tubercle on the other fragment, there will be little or no displacement, as the action of the anterior belly of the *digastricus* and the *geniohyoideus* muscles would equalize the force of muscle-strain in such a manner as to maintain normal conditions. If, however, the line of fracture is such as to leave the genial tubercles on one fragment, there will be marked displacement, since the action of the depressors will pull the fragment to which they are attached downward, while the other fragment will be forced upward by the traction of the elevators at the angle of the jaw.

In summarizing, it may be said that normally the three extremities of the jaw, viz., the condyle, the angle and the chin, each have diverging or converging muscular support; this arrangement of the muscles in connection with the ligaments holds the jaw firm in all of its complicated movements. When the jaw is fractured, normal control is vitally interfered with, and the traction of the muscles attached to the fragments will force and retain them out of normal position, which always is manifest in displacement of the fragments and abnormal occlusion of the teeth.

A thorough knowledge of the physiological action of the muscles which control and influence the lower jaw is necessary in order to make a successful diagnosis and to determine the character of the treatment which should be pursued.

The conditions surrounding fractures in the superior maxillæ are very different than those of the mandible.. This is an immovable bone.

There are no muscles attached to the upper jaw which will influence displacement of the fragments to any marked extent. In cases of compound fracture the force of gravity may play an important role in the displacement of the fragments, and it must be taken into consideration in the selection of the treatment for the case. This force may be quite pronounced in case of complex horizontal fracture of the superior maxillæ, and it may be with some difficulty that the parts are retained in normal apposition on account of it. There usually will be little or no displacement of the fragments in fractures of the upper jaw from other influences.

In the selection of the treatment of fracture of the jaws, all of the forces which favor displacement of the fragments must be taken into consideration. The splints and ligatures should then be so constructed as to overcome these forces so that the fragments may be maintained at rest until consolidation takes place.

(*To be continued.*)

ORAL FOCAL INFECTION*

BY CHARLES A. PEAK, SALT LAKE CITY, UTAH

IN THE ACCEPTANCE of every new discovery or idea, professional men may be classified as radicals, students or research men, or conservatives. That chronic alveolar abscesses may be foci of infection, is not necessarily a new discovery, and yet it is passing through the same stages of incredulity, popularity, abuse and acceptance that characterized the discussion of the germ theory of disease, anesthetics, vaccines and nearly every other new theory with which physicians and dentists have had to deal.

The radicals have attributed nearly every ailment to which man is heir to focal infection, and are claiming that all pulpless teeth are dangerous teeth and are demanding their removal.

The conservatives, because it is contrary to their methods of treatment and different to their training in schools some five, ten or fifteen years ago, are very largely ignoring its importance.

The students, who reach men regardless of the schools to which they may belong or the different viewpoints or angles at which they approach their work, have reached almost the same conclusions, and established some incontrovertible facts. Some of these are:

First: Longevity is increasing. Surgical and medical science have done much along most lines of human pathology and therapeutics and have reduced the severity and death rate of nearly all diseases, with the exception of those associated with streptococci infection. These diseases began to increase in number and severity soon after our recent propaganda of tooth conservation, our over-ambitious root-canal work and our belief in the desirability of retaining in the mouth any and every tooth that could be made of any mechanical service. We were treating teeth, not patients, and it is a noteworthy fact that the wealthy and middle classes who have had the most dental work done are the ones who are suffering most from nervous, kidney, heart and joint lesions.

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*Read before the Utah State Dental Society, 1917.

Second: The same organisms which are always found in these forms of disease are also found in unfilled or partially-filled root canals, alveolar abscesses, infected tonsils, sinuses, etc.

Third: A surprisingly large percentage of people suffering from chronic arthritis, endocarditis, neuritis, nephritis, gastric ulcers, show dental infections. To prove this we could quote indefinitely, records and findings of such men as Billings, Rosenow, Hartzell, Davis, and others. Suffice it to say, however, that this connection is observed in from fifty to eighty per cent. of these diseases. Moreover, no one claims that all focal infection is of dental origin. Mayo asserts that at least fifty per cent. is. Furthermore, the fact that a mouth is free from focal infection does not prove that such a mouth is not responsible, for the infection may have been removed by extraction or otherwise, and the pathological condition might still remain.

Fourth: The bacteria taken from an alveolar abscess and injected into rabbits and guinea pigs will, in the great majority of cases, produce secondary lesions.

Fifth: The germs taken from dental abscesses of people suffering with a specific trouble and injected into an animal will, in most cases, produce the same lesions in the injected animal, showing that the bacteria have some selective activity. Billings has shown that the streptococci group of bacteria may undergo transmutation with changed environment, such as oxygen tension, food supply, temperature, etc. This shows why a form that may be of low degree of virility in a chronic abscess or arthritis may become very virulent with change of food or increased oxygen supply. A germ, for instance, found in a kidney disease in one host may, with changed conditions, produce heart lesions in another host.

Dr. Gilmore in a series of experiments has shown that cultures made from abscesses of people not suffering from any constitutional disorders, will also produce these secondary diseases in the injected animals. This would seem to indicate that, while we may have these abscesses and be free from disease, these streptococci are capable of producing the diseases, and some time, when our resistance is lowered, they may cause serious results. That these abscesses are extremely common is shown by the fact that sixty-five consecutive dental patients had their teeth radiographed, and every one of them showed foci of infection—probably seventy-five per cent. of all devitalized teeth show necrotic areas at their apices. In the East some physicians have become so thoroughly convinced that so-called dead teeth are dangerous to health, that they are ordering their extraction whenever the patient has any of the symptoms of secondary infections. This is, I think, going entirely too far and jumping at conclusions—for we must remember that there are other foci of infection than the teeth, and even if a tooth is the cause, intelligent, conscientious dentistry can often make a safe and useful tooth of a dangerous one. There is a strong possibility that physicians do not appreciate the full value of the tooth, that a tooth once lost can never be satisfactorily replaced, and that its replacement starts a chain of consequences, which in time may be more dangerous to the patient's health than the offending tooth, and that many of these abscesses yield to a careful, thorough dental treatment. . On the other hand, many of our dentists taking a different viewpoint and knowing the mechanical value of a tooth and the disastrous results following its removal and attempted replacement, and not fully appreciative of the constitutional disorders that may be caused by a diseased tooth, go to the other extreme and retain teeth that unquestionably should be extracted. It is difficult to place a proper value on a tooth—for a sound tooth in a sound body is of inestimable value, and a diseased tooth in a diseased body is so worthless that it cannot be extracted soon enough. The combined efforts of physicians, dentists and radiographers are often necessary to determine the proper procedure in many cases of systemic disorders due to the foci of infection.

Sixth: The proof of the pudding is in the eating thereof. Remove dental focal infection and the patient recovers, or shows marked improvement in a sufficient number of cases to indicate that dental infections are the cause of many diseases of focal origin. You cannot, however, always find a cure for the following reasons: There are other foci infections—maxillary, ethmoid, sphenoid, frontal sinuses, prostate glands, fallopian tubes and tonsils. Furthermore, secondary infections may become foci of infection. There is no question but bacteria found in the kidney, heart valves, appendix, etc., may in their turn get into the blood stream and infect the tissues of the mouth. It is for this reason that Price and others claim you cannot keep sterile even for a few hours any periapical lesions. Dental abscesses are therefore not always primary—they may be secondary. It has been frequently noticed that people having chronic tonsilitis and alveolar abscesses often suffer exacerbation of these troubles simultaneously.

It is unreasonable to suppose that after a pathological condition has existed for years and serious changes have taken place in the tissues of an organ, that that organ could return to a healthy normal state by removing the source of infection which caused it, maybe, many years before. It would be just as logical to deny any connection between a typhoid epidemic and a contaminated milk supply, because a typhoid patient did not recover when the milk was purified.

It is because there have not been such serious and extensive pathological changes that we get our best results when we remove focal infection of recent origin. In the long-standing cases we can hope possibly for a gradual improvement; yet most unexpected and satisfactory results are often obtained, although one must not promise too much.

There are often numerous focal points and all of them must be removed and care must be taken in apicœtomies, curettments, etc., that all the necrotic area is removed.

In the foregoing portion of my paper I have simply tried to show that infections about the apices of teeth are of the greatest importance to our patient's health and life, and we as dentists must awaken to the realization that we are daily coming in vital contact with one of the greatest problems that has ever confronted the physicians or dentists. We are either radicals, looking at it from the pessimistic standpoint, ordering the ruthless extraction of pulpless teeth, or we are conservatives, or, shall I say, stand-patters or fossils, who are shutting our eyes to some very self-evident and demonstrable truths, jeopardizing our patients' health and life because we will not see—or shall we all be students? The medical profession, our own profession, our patients, our conscience, are all demanding that we take up this matter seriously and intelligently.

In general there are just two things involved in an infection: the infective virus and the host. We have not time to go into the bacteriology tonight. Suffice it to say that in general it is the streptococci group which is nearly always involved in focal infection. There may be others, but they are of secondary importance.

The affected organism may be virile and in large or small numbers or they may be of low virility and in large or small numbers. The host may offer little or much resistance. There are various kinds of food, degrees of moisture, heat and oxygen tension, protection from mechanical removal, etc., and it is from the action and interaction of these fundamental elements of infection that we have various forms of systemic infections, running in clinical picture from acute appendicitis, pneumonia and alveolar abscesses, to the low grade infection of teeth, etc., which give such a negative local pathological history that till the advent of the X-ray they were not often recognized. The infective virus found in the rarefied areas about the apices of teeth are always of very low grade virility, so low, in fact, that they are often found in these areas without pus.

Some one has said that "Life is a battle between infection and the individual—infection always winning." I would like to change it to, "Life is a war between infection and the individual." In most of the battles the individual seemingly wins. The battles are largely fought on the one hand by the ferments of the bacteria and on the other hand by the ferments of the host's cells, aided and abetted by the leucocytes, lymphocytes, plasma and connective tissue cells. The ferments formed by the bacteria are usually destructive to the body cells. They pass out from the bacteria, diffuse through the neighboring cells, dissolve them and reconstruct them into specific proteins that can be built into bacteria cells. In addition to these ferments are formed toxins. These toxins are characterized by their stimulating the formation of antibodies or toxins by the cell of the host. In addition there are protein poisons formed by the destruction of the bacteria. The by-products of bacterial metabolism are usually poisonous to the host. The body cells meet ferment with ferment, toxins with anti-toxins and with the help of the phagocytes, the antiseptic properties of the serum, the individual appears to win. The destructive process is stopped, the bacteria are walled off. The environment becomes so unfavorable the bacteria make no further progress, and the individual believes he is free from further trouble. The battle may not have been of sufficient violence for the individual to be even cognizant of its existence. A large part of these abscesses have no clinical history; the patient denies that he ever has had any trouble, but the X-ray reveals a rarefied area and the research man finds these areas usually contain streptococci. Now, what has the individual to fear from these colonies of very low virility?

First, although partly walled off, we have the absorption of bacteria toxins; from acute abscesses we get acute toxemia; from chronic abscesses, chronic toxemia. While speaking of toxemia let me explain that while we are confining our discussion to abscesses we get toxemia, bacteriamenia, hematogenous infection from unclean crown and bridge work, gingivitis and pyorrhea. While the streptococci are virtually always found in these conditions, there are often other varieties present and we have a mixed infection. These grow in many combinations, making possible the production of a great many chemical substances. These poisons or toxins have specific action on certain tissues. The diphtheria toxins for instance, are apt to attack the nervous system and produce peripheral neuritis. The clinical picture of chronic toxemia is malaise or a feeling of physical and mental discomfort. The patient is unable to do a full day's work; slight exertions produce pronounced fatigue; abnormal amount of rest is required, appetite is poor, the skin has a sallow appearance; there is often a loss of weight and usually constipation; anemia is frequently caused by toxemia. In acute toxemia we have a different history: Beginning with chills, a rapid rise in temperature, often reaching 104; there is an anorexia, headache, prostration, delirium, stupor and coma—frequently death.

Second, septicæmia. When the bacteria pass into the blood stream and live and multiply, causing a general infection, we have septicæmia. This may not be, truly speaking, a focal infection, but it is so closely connected with abscesses, both chronic and acute, that a little digression will be pardonable.

Most extractors will extract under any conditions, and from their viewpoint and for the relief of the patient, usually it is the line of least resistance. I wish I could conscientiously do it, but what I know of the pathology of abscesses, the serious troubles and fatalities resulting therefrom and the viewpoint of some of the best students of these conditions, there often is a question in my mind of what should be done. I believe the general public and often the physicians and dentists themselves do not realize the gravity of acute dental abscesses. I find that the more the oral surgeon knows of abscesses the more careful consideration he gives to them; each has to be treated symptomatically, and there are so many things to consider that it is difficult to have a definite, settled policy.

While I was in Chicago recently, two deaths resulted from the extraction of teeth by men with whom I was somewhat associated. One of these was by an exodontist. It was one of those slow-forming, low-grade streptococci infections, much induration, involving the glands, probably no points of fluctuation. Within less than a week the patient was dead. The other was by an eminent oral surgeon. The patient was a lady in poor health, a perfect picture of chronic toxemia, decidedly anemic. He extracted four teeth, showing rarefied areas at their apices. He curetted very extensively. In a few days the patient was dead from septicæmia. In both of these cases we had bacteria of low virility, but by changing their oxygen tension and permitting their entrance in large numbers to the blood stream, we got an acute septicæmia. It is also dangerous to extract when you have pus present, for the same reason. You expose a large area of blood vessels which permit of the rapid entrance of bacteria into the blood stream. On the other hand, there is certainly grave dangers in allowing quantities of pus to be held under pressure for any length of time. It must be evacuated by lancing intraorally, if possible, to avoid a scar; extraorally, if necessary, because you will get better drainage, and if lanced properly the scar is usually negligible.

Briefly reviewing, we find that the modus operandi of infection is by the absorption, by the blood or lymph, of the bacterial toxins, living bacteria or infected emboli. This absorption is usually of small quantities, but gradually wears out the protective cells and finally produces disease in other parts of the body which may have become predisposed by lessened resistance, or which may have a special affinity for the injurious agent. It is almost universally agreed that while pyorrhea plays an important part in systemic troubles, the diseases which are of hematogenous origin come from abscess conditions where the bacteria are found under pressure. Time will not permit me to take up a study of these diseases, but let me mention a few:

1. A large group is the affections of the nervous system. These are produced by the continuity of structure and hematogenous infection. The bacterial toxins or pressure as impacted teeth, or pulp stones, irritation produced by protruding broaches, etc., produce an irritation of the second or third branches of the fifth nerve; these acting through an anastomosis or ganglionic communication may produce neurasthenia in any of its forms, or trifacial neuralgia, or neuritis in any part of the head—most frequently affecting the nerves of the eye and ear. Through hematogenous action we may have neuritis in any part of the body; also the toxins and bacteria in the blood may produce more or less localized conditions and neurasthenia that might be caused by continuity of structure.

2. Another very large group of diseases often attributed to oral infec-

tion is arthritis. Because of the minute size of the capillaries and the limited blood and oxygen supply in the joints, we have an area especially adapted to the lodgment and development of bacteria and infected emboli. It is well to remember that in acute infectious arthritis we frequently have pulmonary, cardiac and nervous affections associated with it. It is in this class that we get our quickest and most notable results by removing the focal infection.

3. Diseases of the heart: Dr. R. C. Cabot in an analysis of 600 successive and unselected cases of heart disease classified them under four etiological headings: 46 per cent rheumatic; nephritic, 19 per cent.; arteriosclerotic, 15 per cent.; syphilitic, 12 per cent. A very large percentage you see are of streptococci origin and have their incipiency in the majority of cases before the twenty-first year of age—at the time of life when we are most likely to have tonsilar affections and abscesses from temporary teeth, so we should consider carefully this thought when advising against the removal of diseased temporary molars.

This subject is entirely too big to study in one evening, and we will be obliged to pass over a large part of the field of secondary infections, simply calling your attention to the fact that they are just as important and as closely connected with oral infections as those we have so briefly considered. Thoma mentions forty-seven such diseases. They can be classified, however, in addition to those we have mentioned as alimentary, nephritic, opthalmic, aural, lymphatic and diseases of the blood.

The etiology of the dental abscesses possibly should have been considered first, but I have left it to the last because it is a practical application of what we know touches us in our daily practice of dentistry. The treatment of teeth has been the most discussed problem of our profession. It has been solved in many ways at different times by the profession at large. Thousands of dentists have perfected a modus operandi which was satisfactory to themselves, whether other dentists agreed with them or not; but upon the introduction of the X-ray it was found that no system was perfect. Rarefied areas are found at the apices of a large percentage of teeth treated by any method. This infection is produced by either or both of two methods: Lack of asepsis in treating or by means of the blood stream. I think nearly all thoughtful men agree that we could reduce to a negligible quantity the number of apical abscesses due to a septic technic in our work, but there is a wide divergence of opinion as to the means of reducing the number of hematogenous infections to the minimum. Consensus of opinion almost entirely eliminates arsenic as a devitalizing agent. Destruction of at least a small portion of the peridental membrane almost always follows its use; but here we part company. Some men believe in the mechanical enlargement of canals; others in chemical methods as potassium, sodium and sulphuric acid, and still another group have abnormal respect for the peridental membrane—fear the use of either mechanical or chemical agents. They admit the necessity of removing all pulp tissue, the filling of canals, and their accessory foramina to the apices, if it can be done without the irritation of the peridental membrane. They point out that the X-ray shows that the percentage of rarefied areas about the apices of partially-filled canals is possibly not so large as in well-filled or over-filled canals. They can show, to their own satisfaction at least, that the use of mechanical devices or strong chemicals, even the essential oils, results in the destruction of the peridental membrane, and point out that when it is once destroyed it is never reproduced. One of the very worse agents according to them is formalin and all root canal fillings that are dependent upon it for their therapeutic action. Personally, I believe the latter group have the best of the theoretical argument, for when you have any irritation of the peridental membrane by mechanical, chemical or therapeutic agents, you may have a destruction of the peridental membrane, and when it is once lost, infection from the blood stream may occur at any time. My subject, however, is not root-canal treatment, and I wish to avoid stirring up a hornet's nest by arousing a discussion thereon tonight; but when fifty to ninety per cent. of all pulpless teeth show rarefied areas about their apices, and from them we may have all the serious complications of secondary infection, I believe it is the biggest question we dentists have to consider, and I believe it is not yet solved. It is consuming the attention of a great many thoughtful men. Their technic is becoming highly developed; some very beautiful work is resulting, but time alone can tell us what the final verdict will be. Upon this much we can agree: exclude the use of arsenic as far as possible; always use the rubber dam and approach surgical asepsis as nearly as practicable. Avoid irritations; use mild agents in your work, and we should never undertake the treatment of a pulpless tooth except with the full realization that a pulpless tooth is always a questionable tooth which may at any time become a dangerous tooth, and we are not drawing upon our imaginations when we say it may, under changed circumstances, become a fatal tooth. Even men with conservative predilections are questioning whether it is ever right to devitalize a tooth for crown or bridge work or for any purpose, except where necessary to preserve a tooth.

In conclusion let us make some general deductions. All focal infection is not of dental origin, but a sufficiently large percentage is to demand a careful study of the mouth and teeth in all cases of systemic infection, for in these cases all foci should be removed. It is the dentist's field to remove the oral foci, be they pyorrhea, septic conditions about the crowns or bridges, or alveolar abscesses; these abscesses often can be located only by means of the X-ray, for we frequently have no history of pain or trouble of any kind. We must co-operate with the physician, for it is here more than any place else that our fields overlap. He must be shown that we are alive to the prevalence and importance of oral focal infection, and that we can be relied on to intelligently and conscientiously handle our end of the work. The ruthless extraction of teeth, as demanded by some of the physicians, is a crime against the patient, an indictment against the physician and the surgeon, and a sad commentary on the co-operation and understanding existing between the medical and dental professions. The mechanics of dentistry, the locating and cure of oral focal infection is outside of the physician's field, but it has taken the physicians to point out to us that our modern dentistry, so perfect in a sense in its mechanics, is a menace to our patients' health and lives, and we must recognize the fact that our work has a very much further influence on our patients' systemic condition for good or ill than we have dreamed. But let us not be stampeded into the belief that our treatments of teeth are the cause of all the troubles in the world. I think possibly our failures are not nearly as many or as grievous as the X-ray paints them. We have found that we get apical infections from the blood stream. Some surgeons demand that all infections be removed before they operate. Treating a tooth is a surgical operation. How would it be if we demanded that all focal infection be cleaned up before we devitalized? How do we know that many of these apical abscesses are not secondary in place of primary? Is it not reasonable that they are? How can you expect to get perfect results from treatments when the blood is filled with streptococci from tonsils, sinuses, gastric ulcers, etc? So in place of being the arch sinner, maybe the teeth are the most sinned against organ in the body.

The serious consequences of root-canal work assumes such huge proportions that we must do all in our power to preserve the vitality of the teeth. I think we must not devitalize except in rare instances for the attachment of crowns and bridges. We owe it to our patients and to our profession to talk vital teeth in season and out of season, and when the public appreciates the gravity of devitalized teeth the people will give such attention to their teeth that the necessity of treatments will be greatly reduced.

The sum and substance of the whole matter is that infection must be removed wherever found in our field, by treatments, resections or extractions.

619 Boston Building.

TO REFIT A RUBBER PLATE WITHOUT VULCANIZING

BY L. E. CUSTER, D.D.S., DAYTON, OHIO

Smear the plate with plaster, place in mouth and when hard remove. Pour a model. Remove plate and also its plaster covering from same. Having had the shot of a Parker shot swager in boiling water or preferably glycerine, place the plate upon the model and embed in the swager. Do not hammer but place a heavy weight upon the piston. Remove when cold.

THE DENTAL SURGEON IN THE MILITARY SERVICE*

BY A. LOUIS PETTEE, D.D.S., BRATTLEBORO, VT.

WHEN YOUR CHAIRMAN requested me to address you on the subject of The Dental Surgeon in the Military Service, he said, "I understand that you are interested in getting dentists into the army, and will you deliver a paper on the subject?"

Getting dentists into the army doesn't interest me—that is something I will willingly leave to the General Staff or whoever happens to be the recruiting officer of this district. I am, however, very much interested in trying to demonstrate to the regimental staff of the Vermont National Guard the absolute need of caring for the mouth and teeth, together with the nose and throat, of every individual soldier, and I have used every influence at hand during the last three years to convince these powers that good health, personal appearance, pride and endurance of a military force has its foundation in a clean, sanitary mouth.

In taking up the question of the Dental Surgeon in the Military Service, I am very much at a loss where to commence. The history of the struggles of the dental profession to obtain recognition by the medical department of the army, takes on very much the appearance of a tragedy, and is filled too much with black pages of professional jealousy on the part of the medical profession to warrant its being reviewed. Nor can it be of any service to us to review this history now, except insofar as to cause us to honor the men who have been influential in causing the war department of the United States to recognize the dental profession, first of any country in the world, and would time permit, there is enough material, the perusal of which would fill us with inspiration to continue the work of these great and good men.

Today we are facing serious problems, the successful solution of which must come, and come not by legislative and departmental efforts alone, but by the united patriotic activities of small circles of men and women, and even the children; each individual has his duty to perform and his business at the present moment consists in finding his place in this great scheme of preparedness.

The dental profession of the state of Vermont has responded to its first call; that response has been instantaneous and without questioning. The duties incident to the call of the Adjutant General have been discharged, the work has been done and done well, and I hope that I voice the feeling of every dental surgeon in the state who participated in this work when I say that I thank God that I am a dentist and that I have been enabled to use my professional abilities to perform a patriotic duty, which none but a dentist could have done, and I thank the Adjutant General for the confidence he has shown in the profession by calling upon us.

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*Read before the Vermont State Dental Society, 1917.

Now, let us look at this thing from the professional side of the matter. Has this been the best way to perform this service? Should not the burden fall equally upon the tax payers of the country rather than upon a special class? I do not believe I need to take any time in arguing the case before a body of self-thinking men, that it most assuredly is not, *positively is not* the best way, and must not be allowed to be again necessary; and, gentlemen, it is the duty of the dental society of the state of Vermont to find what *is* the best way.

Our duty is clear, our place has been found for us in this great game of preparedness, and I am confident that we here in little old Vermont can demonstrate new methods, higher ideals and better principles, if we will face this thing squarely and grasp this most excellent opportunity which has been presented to us. Therefore, be it resolved, that we as patriotic American citizens—Green Mountain boys—the dentists of the state of Vermont, here in session assembled, do hereby determine to solve this problem of how best to serve our country and our profession.

Now, what are the existing conditions in the military service? If any of us wish to enlist in the army as dental surgeons, how shall we proceed, where shall we go, how do we do it, what will be our duties as professional men, how long the service, what prospects of promotion, etc., etc.? These are questions of vital importance to us and the answer to each question is a matter of record and can be found easily by referring to a copy of the Manual of the Medical Department to Army Regulations, or to any of the circulars published by the war department, and to be obtained by applying to the Superintendent of Public Documents at Washington, or by writing to the Secretary of the Preparedness League at Buffalo. I feel that the time allowed for this paper is too limited for me to go into detail because I wish to take up another phase of the subject, but I will be pleased to give any information I can to anyone interested after the meeting is closed. And, by the way, if you are not already a member of the Preparedness League of American Dentists, join immediately. By and by your time will be so taken up in being ashamed of yourself for not joining that you won't have time to join.

We have had in Vermont a regiment of theoretically 1000 men. I say theoretically because most of the time its ranks have not been full, and therefore we have had less than 1000 men, and in the war department ruling there may be a dental surgeon to every 1000 men. So Vermont, up to within a very short time, has not been entitled to a dental surgeon in her medical department. The result of this ruling, those of you who have participated in the work of the regiment have had opportunity to observe; you have found that about ninety-five per cent. were in need of dental services, were absolutely unfit on this account to go into the field and be submitted to the usual wearing processes of army life, enduring hardships, the rigor of the seasons, endurance tests beyond description, without the reasonable expectation that a large percentage of them would be continuously unfit for duty on account of dental trouble; and a much larger percentage would be reduced and incapacitated on account of sickness, directly traceable to infection from unclean and unhealthy mouths.

England's experience, according to medical reports, showed that twenty-five per cent., one-quarter of the fighting strength of her first expedition to France and Belgium, was constantly off duty on account of dental lesions alone (how many were off duty on account of sickness due to oral infection has not been reported); they did not have a sufficient number of modern American dentists on the job to enable them to determine this very important phase of the subject. Nevertheless, they found it necessary in the early part of the war to despatch 3,000 dental surgeons to the trenches to undo the neglect.

In justice to the First Vermont Regiment, I wish to state that they were not an exception to the rule. This deplorable condition has proven to be one of the fruits of unpreparedness throughout the whole country; however, Vermont is what particularly interests us, and having determined these truths, by personal observation, by direct contact with the soldiers themselves, we come to a realizing sense that this state of affairs always has existed, and always will exist, until the dental profession arouses itself and responds in some way to what we might truthfully say is the call of the entire world.

Now, while this call is being responded to by the dental profession as a whole, yet it is the individual dentist who must make the sacrifices and bear the brunt of the whole affair, and while we are gathered together here, brother practitioners from the same state, peculiarly united and with common interests, it is incumbent that we should ask ourselves and each other the question: How shall *I* respond to this call of duty? What are some of the circumstances which will surround me if I do respond?

Well, gentlemen, we might find ourselves under some of these conditions: Suppose, for instance, the Adjutant General writes you a letter requesting you to serve, or some other pressure is brought to bear on you, or your patriotism assumes authority and you decide to offer your services. You say to yourself, How can I do this? I have a practice bringing me anywhere from five to fifteen thousand dollars; I have interest money to pay, I have invested in new equipment, etc.

You have had an uphill climb extending over a period of years to acquire your practice and attain your present position. You perhaps started your days in college with insufficient funds, you have worked your own way and your struggle has been too severe for you to consider an unconditional surrender to this call of the blood without a very serious reflection upon the effect it may have upon your future professional welfare; and you feel that it would be almost suicidal to you to close your office, leave your patients and your family and go to the front, in meek obeisance to this thrill of patriotism which goes coursing through your veins.

You conclude that the sacrifice is too great, you argue that as far as the experience goes it cannot amount to much to a dentist—a physician might become a great surgeon through valuable experience in war surgery, or at least receive considerable prestige in the eyes of the people for simply having been an army surgeon; but for you it is different—you might become a most proficient army dental surgeon, highly skilled in the plastic surgery of the face and do some of the wonderful things which are being done at the front, attracting the attention of the entire world, but when you return home you must again be simply a dentist, and whatever of such skill you may have acquired will be rather useless as a commercial proposition. People will then be no longer mangled and require plastic surgery; bullets will no longer fly, and you must store away your skill and experience until the next war comes.

Possibly you will decide that you will obey this call of the blood, enlist and become a member of the Dental Corps of the United States Army. You must close your office, your equipment must be stored, your rent given up, your assistant must find herself suddenly without a position, you must turn your patients lose to hunt their own welfare. These people have been faithful to you, dependent upon you, true disciples of your teachings; they never have thought of turning from you, and if you leave them without making proper provision for their care during your absence, you show yourself a man of very small caliber indeed, possessing a very low appreciation of the patronage you have enjoyed, and you are miserably failing to discharge a very sacred professional obligation. You feel that probably your practice will have scattered to the four winds and, except for a few old faithfuls, you will spend a period of years in getting back to the position you occupied when you left it. And you very wisely decide that you must leave this enlistment business to the young graduate who has less to sacrifice, however inexperienced he may be.

So with these arguments before you, these truths laid bare, you dare not take the chance, and the army at the front loses the benefit of the judgment, skill and experience of a great many proficient men—except a few rich ones who can afford it.

Will you kindly let me digress from my subject long enough to read to you Gen. McMahon's famous tribute to the Old Vermont Brigade? He called it the best brigade in the Army of the Potomac:

"By request we reprint the following tribute to the old First Vermont Brigade. It was first printed after the close of the Civil War, and was entitled 'The First Vermont Brigade,' by one who did not belong to it and who was never in Vermont. Its authorship was not known for some time, but finally was discovered and acknowledged by its author. This was Gen. Martin T. McMahon, who was chief of the staff of the Sixth Army Corps, under 'Uncle John' Sedgwick, and had ample opportunity to see the Vermonters in camp, on the march and in battle. He has been United States Marshal in New York, United States Minister in Paraguay, and held other important offices. He is now Judge of the Court of General Sessions in New York City, and he takes back nothing of his old high opinion of the Vermont troops.

"They were honest farmers turned vagabonds. They were simple countrymen changed into heroes. They were quiet townsmen that had become rovers. They stole ancient horses and bony cows on the march. They pillaged moderately in other things. They swept the dairies and stripped the orchards for miles where they traveled. They chased rabbits when they went into camp after long marches; they yelled like Indians when neighboring camps were quiet through fatigue. They were ill-disciplined and familiar with their officers. They swaggered in a cool, impudent way and looked down with a patronizing Yankee coolness upon all regiments that were better drilled, and upon that part of the army generally that did not belong to the Vermont brigade. They were strangely proud not of themselves individually but of the brigade collectively, for they were the best fighters in the known world. They were long of limb and could outmarch the army. They were individually self-reliant and skilled in the use of arms, and they honestly believed that the Vermont brigade could not be beaten by the combined armies of the rebellion.

"They were veterans in fighting qualities almost from the first skirmish. This was at Lee's Mills. They crossed a narrow dam under a hot fire, made the attack they were instructed to make and came back, wading deep in the water with a steadiness that surprised the army. They were an incorrigible, irregular, noisy set of rascals. They were sworn at during their four years of service, yet they were at all times a pet brigade. There were but two things that they could do—march and fight, and these they did in a manner peculiarly their own. They had a long, slow, swinging stride on the march which distanced everything that followed them. They had a quiet, attentive, earnest individual way of fighting that made them terrible in battle. Each man knew that his neighbor in the ranks was not going to run away, and he knew also that he himself intended to remain where he was. Accordingly, none of the attention of the line was directed from the important duty of loading and firing rapidly and carefully. When moving into action and while hotly engaged, they made queer, quaint jokes and enjoyed them greatly. They crowed like cocks, they baa-ed like sheep, they neighed like horses, they bellowed like bulls, they barked like dogs and they counterfeited with excellent effect the indescribable music of the mule. When, perchance, they held a picket line in the forest, it seemed as if Noah's ark had gone to pieces there.

"In every engagement in which this brigade took part it was complimented for gallant conduct. One of the most remarkable of its performances, however, never has appeared in print, nor has it been noticed in its reports. After the battle of Gettysburg, when Lee's army was in the vicinity of Hagerstown and Antietam, the Vermont brigade was deployed as a skirmish line covering a front of nearly three miles. The enemy was in force in front near Beaver Creek. The Sixth Corps was held in readiness in the rear of the skirmish line, anticipating a general engagement. The enemy evidently had determined to attack. At last the line of battle came forward. The batteries opened at once and the skirmishers delivered their fire. Our troops were on the alert and stood watching for the skirmishers to come in, and waiting to receive the coming assault. But the skirmishers would not come in, and when the fire died away it appeared that the Vermonters thus deployed as a skirmish line had actually repulsed a full line of battle attack. Twice afterward the enemy advanced to carry the position and were each time driven back by the perverse skirmish line. The Vermonters, it is true, were strongly posted in the woods, and each man fired from behind a tree. But, then, everybody knows the etiquette in such matters is for the skirmish line to come in as soon as they are satisfied that the enemy means business. These simple-minded patriots from the Green Mountains, however, adopted a rule of their own on this occasion and the enemy, disgusted with their stupidity, retired across Beaver Creek.

"When the Vermonters led the column on the march, their quick movements had to be regulated from corps or division headquarters to avoid gaps in the column as it followed them. If a rapid, forced march was required, it was a common thing for Sedgwick to say with a quiet smile, 'Put the Vermonters at the head of the column today and keep everything well closed up.'

"After the riots in New York when it was found necessary to send troops to the city to prevent recurrence of the outbreak, the Vermont brigade was especially named by the war department for this duty. Within two hours from receiving this dispatch the command was enroute to the city. They occupied the public squares here for some time and enjoyed themselves not wisely nor yet virtuously, and returned to the army of the Potomac sadly demoralized in all but the two great essential qualities of fighting and marching. It was a fortunate thing for the New York mob that it avoided conflict with the New England troops at this time.

"Upon the return of the brigade to the field they quietly held on to their own routine of life and maintained to the close of the war their splendid reputation they had won at the very outset.

"There were many regiments equal to the Vermont regiments in actual battle, and some that, like the Fifth New York Volunteers, not only equalled them in fighting qualities but surpassed them in drill, discipline and appearance on parade. As a brigade, however, they were undoubtedly the best brigade in the army of the Potomac. For they not only fought as well as it was possible to fight, but they could outmarch with utmost ease any other organization of the army. It was the intention of the writer to refer only to this brigade as furnishing the best type of American soldier, but this article has grown beyond his intended limit; we have, therefore, not space to examine into the cause of this superiority. Two, however, may be briefly stated. First, that the regiments from Vermont were brigaded together. This rule, strange to say, seemed to work well only in the smaller states like Vermont and New Jersey.

"Second; the fact that Vermont, during the first year of the war recruited for the regiments and kept them full. Regimental and company officers, knowing that their ranks would be filled up, discharged men freely and thus managed to get rid of their weak and worthless soldiers. For these reasons the Vermonters were good men. They were fortunate however, in having such commanders as Gens. W. F. Smith and W. H. T. Brooks. It naturally resulted from this combination of circumstances that they became a great power in battle and earned a reputation of which every man and woman in Vermont may well be proud."

Gentlemen, these boys whom we have seen go out from our towns, enlisted in the present cause, are some of them grandsons of those boys of the First Vermont Brigade, some of them your own sons, or your neighbors' sons. You know them, you are proud to have known them; they are made of the same stuff, they are carrying the same banner, and when the time comes will bring back the same victory. I ask you as man to man, do they not deserve the very best there is in our profession; do they not deserve to be served in turn by every skilled operator in our profession, and are we discharging the patriotic duties of a profession, *second to none on earth*, if we leave one single stone unturned to enable any member of that profession to enlist for the service?

We hear a great deal about agricultural preparedness and co-operation and industrial preparedness and co-operation. I suggest to you professional preparedness and professional co-operation. If a man from your town has enough good old Vermont stuff in him to feel that his duty to his country and his profession lies at the front, let us to a man make it our duty to see to it that when he returns home again as a brother practitioner he will find that his practice will be returned to him; that no advantage has been taken of his absence, that his patients have been carefully instructed that it is their patriotic duty to return to him as his patients, and that under no circumstances whatever will you countenance a deviation from this sacred principle.

I am a republican and a Vermonter, but I am an American first, and today we must all be Americans, first and last, and as Americans we must by this time realize that as a nation we are fighting for ideals, and those ideals must be achieved. As a profession let us also fight for professional ideals. Let us by organization and co-operative action so arrange it that the enlisted dental surgeon will have the positive assurance that when he returns home from his country's service he will find that his entire practice will have been well cared for and will be returned to him intact.

Now, like all ideals, this one cannot be achieved without many attending difficulties, and it will be necessary, regrettable as it may seem, to have rigid regulations to abide by, to control a few of the less scrupulous members of the profession; and, Mr. President, I move that before this meeting closes the Vermont State Dental Society place itself on record in support of this sacred principle, and that a committee be appointed to draw up and define a rigid code of ethics to be observed by everyone concerned, and whose duty it shall be to enforce and see to it that a violation of our regulations shall be considered and treated as high treason to the entire dental profession.

I realize that this is a difficult and delicate matter to handle, but we here in Vermont are peculiarly and favorably situated to handle a problem of this kind. It can be done, and when it is done it will have the effect of freeing every member of the profession to discharge any patriotic duty he may be called upon to perform.

We are practicing in towns and cities of a few thousand inhabitants, we are fairly well acquainted with a majority of the people, we know tolerably well who are our brother practitioners' patients, and he is equally posted as to who patronizes us; and I think that I may safely say that in our state at least the old spirit of competition in professional life has, with a few exceptions, given away to that more modern, broader and universally-benefiting spirit of co-operation.

With the spirit of co-operation already rampant it is but a step to the attainment of that ideal condition I have just recited to you. Consider for a moment that a brother dentist in your town has gone to do his bit; a stranger comes into your office. Ordinarily it would be considered a breach of etiquette to inquire who her previous dentist was, but this is war-time. You have new conditions to meet, and you boldly inquire if she is a patient of a brother dentist who is absent from his practice. You find that she is. You inform her that you will be pleased to do any work that you can for her in his absence, you give her to understand that the work is being performed by you for him, and you instruct her in this new regulation of the dental society, and if occasion requires it, you frankly state that under no consideration can she become a regular patient of yours, or in fact, of any other dentist in the state until after she has reported to him upon his return. You will make out a chart in triplicate of the work you have performed, one you give to the patient, one you keep yourself and the other you hand over to the absent dentist upon his return to resume his practice, that he may know how his patients have fared and can continue his charts unbroken. We will do as we would be done by and the result will be more lasting and satisfactory to us than any financial gain we may receive by any procedure short of a square deal.

You will charge a fee or not, just as you choose; but you will insist that the patient show the same quality of patriotism that the profession has determined to show and stand by her dentist. These times are not the times for people to change dentists, simply because a red-blooded man has gone to the front, and is temporarily absent from his practice.

When the time for discussion comes, I challenge any man to show me a higher principle. If this is a high principle, let us adopt it.

Now, gentlemen, having considered the first essential thing in professional preparedness, I wish to direct your attention to what I believe is a very important action for the dentists of the state to take. I refer to the organization of a dental unit. We do not know how far this war is going to lead us or how long it is going to last, but if Vermont goes into this war as she has all others wars, there will be plenty of work for all Vermonters to do, and we dentists cannot afford to have any stigma attached to us by not being ready when the time comes.

I have studied the problem for some time and I am thoroughly convinced that if the dental profession wishes to serve well the soldiers of our army during this war, it will be best to do it independently, by our own units, under our own regulations and as far removed as possible from departmental indifference and red tape. I do not desire to criticise the war department, because this is not the time for criticism—this is the constructive period; yet when we observe that army regulations call for two dental surgeons to be connected with a base hospital, designed to care for 20,000 wounded soldiers, we wonder who made these rules.

Think this over: Two dental surgeons to 20,000 men, and when we know that a large percentage (some reports show as high as sixty-five per cent. of the wounded in trench warfare) receive their wounds in the head and face, we are justified in concluding that we would rather be connected with a more efficient organization. When we read that last summer thirty-nine volunteer dental surgeons were sent to the border and not one of them was furnished with either an equipment or a place to work, we are justified in concluding that we would rather not volunteer.

When we learn that as a dental surgeon we must serve eight years as first lieutenant before we are entitled to take examination for promotion to captain, and then we must serve twenty years before we can take examination for promotion to major, and not even then if there are already fifteen major dental surgeons in the service, no matter how efficient we may become, we are justified in concluding that we are not ambitious to become servants to this ruling.

When we learn that at the request of the congressional committee appointed to draw up the bill entitled "An act for making further and more efficient provision for the national defense," a committee of dentists was appointed by the National Dental Association to make recommendations for the reorganization of the dental corps in the United States army, that not one of the recommendations of this committee was adopted in the final passage of that bill, June 3rd, 1916, we are justified in concluding that Congress and the war department have miserably failed to learn one lesson of the European War regarding the importance of dental services.

When we learn that it was only by a hard fight in the lobby that Congress did finally consent to give the dental surgeon a rank in the army, we are justified in concluding that the importance of our services has not yet been appreciated there.

When a study of the Manual of the Medical Department convinces us that the dental surgeon is considered second in importance to the veterinary surgeon, we are justified in being surprised.

When we learn that, according to the latest ruling of the war department, no man over 35 years of age can be commissioned as first lieutenant, and no man over 40 years of age can be commissioned captain, we are justified in concluding that we had better form our own dental units, and when Uncle Sam needs us he can come after us and we will be ready.

As a profession and in the present emergency, we care not for military rank, decorations and stripes. We know and the nation is about to learn that the dentist is needed almost as much as the physician; that dental health is a necessity, not a luxury, and that the longest stride in preventive medicine is being taken by the profession which we represent; and we know that a grand awakening is coming one of these days, and when it does come it must find that we have been up and doing since the dawn.

Those of us who were educated in the schools of Vermont are well aware that history shows that Vermont never has been in the habit of waiting for some other state to set her an example.

I suggest to you that we organize a dental unit peculiarly our own, designed on lines of the highest efficiency, calculated to give the very best possible service in war and in peace and with as little disruption as possible to the even tenor of our way.

In the organization of this unit I suggest that a dental surgeon be appointed in each town and city of the state containing a company of the regiment, that these men prepare themselves by studying the needs of their peculiar specialty; that if occasion demands it the state be asked to provide this unit with the regulation dental corps ambulance such as now is being found so useful in France; that in the meantime every member familiarize himself with the use, transportation, etc., of the field equipment furnished both by the Red Cross and the war department; that they pursue a special course of study of emergency surgery, first aid, the effect of bullet wounds and shell fire, etc.; that they provide themselves with a Manual of the Medical Department, drill regulations of the sanitary troops, and such other department manuals as are liable to prove of usefulness, and become as familiar as possible with the regulations therein contained. That they may formulate some plan whereby, in the event of only one or two members of the unit being called at once, they can be relieved of service after a definite time, and return to their practices. That the ranks of this unit constantly be kept filled by new enlistments, and that the unit occupy the position during the war as a reserve dental corps for this state, and when peace comes again, it shall organize itself to take care of the enlisted soldiers of the state in the way that seems for the best good of the profession and the state government. I also would suggest that this unit might prove of usefulness in peace times, as an auxiliary to such organizations as the National Oral Hygiene Society, etc.

They might prove a valuable power in solving such problems as the school dental clinic in Vermont, and carrying the doctrine of mouth hygiene into the rural communities; they might be able to convince the custodians of the state treasury that the dental health of the inhabitants of this state and every other state is something that as a commercial proposition the state could well afford to pay for.

A year ago the 29th day of January, 1916, the first dental attention ever given by the dental profession to a company of the National Guard of the United States was given by a few members of the dental profession of the state of Vermont, at Brattleboro. Later on, the Preparedness League of American Dentists was organized. In June, 1916, the

Forsyth Infirmary at Boston opened its doors to repair the mouths of the Massachusetts militia. Later, at South Framingham, twenty-one dentists performed a few hundred thousand operations in three weeks' time; until today the movement has spread throughout the whole country. But it was started with the dental profession in Vermont, and so, brother practitioners, profiting by this, let us form a dental spirit and a dental unit that will be a model for the rest of the country.

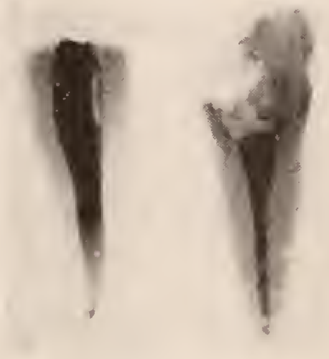
DOES CHLORO-PERCHA RADIORAPH?

BY N. L. BURKE, D. D. S., GRAND RAPIDS, MICH.

In the April issue of THE SUMMARY, Dr. W. C. Davis, of Lincoln, Neb., published an article entitled, "Chloro-percha Does Not Radiograph."

If his findings are not correct his article is very misleading, and should not be relied upon in examinations of root fillings by X-ray.

From experience in X-ray work it appealed to us that chloro-percha should throw a shadow. We carefully prepared roots just as Dr. Davis did. However, before pumping the chloro-percha into the apical third of root we covered the apical end of root with wax, leaving a space around the foramen to take the place of the bony construction where a root is in situ. Otherwise we followed the same technic as Dr. Davis.



All our root fillings of chloro-percha showed up strong by the X-ray. In the accompanying X-rays the chloro-percha shows not only in apical space but also surrounding canal point in the basal portion of the root.

Dr. Davis leaving the foramen open may have forced the chloro-percha out, or the chloroform may have evaporated through the foramen, leaving nothing to radiograph.

PATRIOTIC ADDRESS*

BY JUDGE WILLIAM L. DAY, CLEVELAND, OHIO

FORMER JUDGE OF U. S. DISTRICT COURT

JUDGE WILLIAM L. DAY

I AM ONE of those individuals who throughout a lifetime have had a more or less intimate acquaintance with your wonderful and learned profession. I learned tonight for the first time that Paul Revere was a member of your profession.

I have read your program with interest, and note the wonderful things you are to hear about, the treatment of different sorts of teeth and various dental operations, and as I read that program I thought I had experienced most of these things, and possibly if I was fortunate enough, I might experience the rest of these demonstrations. I am also mindful that when I am done with this short talk, I will be followed by one of the most distinguished members of your profession. It was my great pleasure to meet him tonight, and I wish to congratulate your profession on having a man like Dr. Brophy in your membership.

I am not going to make a patriotic address tonight. To my mind the time has come when you cannot speak about these things to any great extent; you cannot talk about the things we did six months ago and try to stir up patriotism. The time has come now when we must do things. We must act, and we are measured by our deeds and not by our words.

I am appreciative that tonight I am talking to men of a great profession. I realize that in this war your hearts are with every endeavor, that no matter what your creed, no matter what your politics might have been a few months ago, tonight every member of the dental profession stands back of the President with every bit of his energy. And, being a member of another profession,I have the realization that in our daily lives we are far from the firing line. The lawyer or the dentist wears no uniform; he does his daily work without the music of bands or the waving of flags, but he has just as important a function to perform as the man who is giving his all at the very front. There is nothing romantic about going into court and trying a lawsuit, and trying to make the jury believe that the train that hit the farmer's wagon was not at fault. There is no romance in trying to convince the judge that your client is faultless, and I suppose there is no romance in cleaning out a root canal and extracting a tooth; but it is a necessary service, and it is the place in life we must fill today.

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*An address before the Ohio State Dental Society, Cleveland, December 1917.

I cannot talk to you as I would to many audiences; I cannot appeal to men of your type asking you to be patriotic—you are presumed to be, and I know you are. I take it for granted we are all patriotic, we are all earnest and that we all realize we are in a great war in which every individual must do his share. Things have happened, however, that bring back to us not only the realization of patriotism, but we have feelings that I think approach the feelings that a man will have just before he goes into battle. A few weeks ago over at the Central Armory, Ambassador Gerard, lately returned from Germany, made a wonderful address. He told of his experiences over there with the German people, about the talk he had with Von Hindenberg in which that distinguished German said to him that it was the aim of the German Empire to vanquish the Allies in Europe and then, with the aid of the British fleet, to come over here and levy tribute on the United States. He told of an interview he had with the kaiser, when the kaiser said to him that America had better be careful, or later on he would settle with us; these things, actual facts, were told by our accredited representative to that nation. Some of you, perhaps, have heard Dr. Hillis; you may have heard Sergeant Empey, the American boy who went over the top on the French front; you may have heard Jan Hay. All those men who have seen things over there can tell about those things, and they can tell them in a way that makes us believe them. They tell about the terrible things that have happened. I have heard those men tell things I couldn't tell here tonight. I couldn't tell some of the things to men, but I have a recollection of Harry Lauder telling that the Germans took some of the Black Watch Guards, the Scottish soldiers, took off all their clothing, put them in a trench all night in the rain and cold and the freezing water, and in the morning they lined them up and marched them out over No Man's Land, and those men had gone a few hundred feet when the Germans turned the machine guns on them and killed them in cold blood. I have read the book of Private Peat. He told how two Canadian brothers detailed on listening watch on the German lines, and one brother was captured late in the night. In the morning the other brother, returning to the Canadian trenches, looked out across No Man's Land and upon the parapet of the trench was his own brother, nailed hand and foot to a cross by the Germans; and the Canadian had to shoot his own brother to put him out of his misery. You have heard how the German airmen flew over Roumania and gave poisoned candy to children; you have heard of the outrages on women and mutilation of little children in Belgium; and still it seems we have people in this country who DARE to talk pacifism, and who DARE to tolerate a German propaganda.

I maintain now and always have maintained that here in Cleveland we have the most cosmopolitan and most patriotic city in the United States; yet on Thursday night we have this spectacle brought to the city of Cleveland: A man, leader of a great orchestra, who was an officer in the Austrian service, who has been accused of disloyalty, who has been watched by the secret service men; he comes to Gray's Armory and will take the money of loyal American people away with him, when treachery dwells in his very heart. Should that be tolerated? And that will happen unless prevented.

During the late mayoralty campaign we had Rothenberg, a convicted man, running for mayor, his campaign advertised in the newspapers, holding meetings and talking to hundreds of people; and we tolerated that in cosmopolitan and patriotic Cleveland. We men of the professions, we men who do not wear the uniform, we men who must carry on the tiresome routine of daily life, can at least insist that in our midst we will have no pacifists nor pro-Germans.

It has been said well, and it has been said often, that in this country of ours there is no middle ground; there is no place for the luke-warm citizen; there is no place for the man who loves Germany more than he loves the United States. There is no place for the man who hates England more than he loves the United States; but the time has come when we must draw the severe and harsh line between the patriot on the one hand and the absolute traitor on the other.

It was not more than six months ago that they had a peace convention down in Washington. A number of distinguished men, effeminate, perhaps, in character, negative in disposition, held a peace meeting. They passed around white carnations, talked about the atrocities and cruelties of war, talked about those things at a time when their very brothers were giving their lives over there in France, and finally it was suggested to one of them, a man of great distinction in this country, "Under your plan what would you do if the Germans landed in New York?" And his reply was: "We would argue with them and treat them kindly." And that was tolerated in this country not over six months ago!

I do not know whether any of you recall; if any of you have been brought up in the smaller towns of Ohio, back not many years ago you will remember, especially in the more German communities, we had school readers, and we would read in them about the wonderful kaiser, about that race of supermen destined to rule the world; the people who were always right and could do no wrong; and that propaganda spread throughout the land. In the little school I attended we didn't know the

"Star Spangled Banner;" we learned the "Wacht Am Rhine," twenty-five years ago here in Ohio.

We have these propagandists in every place. They tell us that they put the Canadians in the front trenches and that Great Britain does nothing. We stand back and sometimes we interne one of them who becomes a little too rabid; sometimes we sentence some of them to the penitentiary; but I have given a little thought to the subject. The only crime that is defined in the Constitution of the United States is treason, and treason is a very simple thing. It is levying war against the United States, and adhering to its enemies in time of war and giving them aid and comfort. In connection with these plots of blowing up bridges, dynamiting factories, etc., don't you gentlemen think that if you were sitting on a jury and some pro-German was indicted for treason under the definition I have given you, you would find him guilty? I believe in handling this thing as you do when you are in any fight; indict some of these men who are to blame; if found guilty by a jury, let them stand up and be shot.

Now, when I say these things I refer to the German. I do not refer to the American. I do not refer to all of those citizens we have in this country who left Germany because they wanted to come over here and enjoy the blessings and humanity of our government. I do not refer to those splendid fellow citizens of ours who have German hearts no longer, who have German sentiments no longer; but though German in name only, are just as loyal and just as true as any of us, and there are many of them.

There is one thing I regret very much when I talk to people on subjects like this, and that is you can only tell about things you have heard or read of. We men haven't any idea of it, and do not realize anything about it; but I have noticed men like Sergeant Empey, who went over there, and like Private Peat of the Princess Pat Regiment, and Jan Hay, and Whiteair, of the Y. M. C. A.—they can tell things with every detail and every word they say makes more of an impression than all of the things men like myself could say or all of the books printed could convey to any one of us. One thing I did observe: Back in the early part of the summer you remember they had the selective service draft, and they took men from all walks of life, and they were selected and sent to the training camp in Chillicothe. The war committee held several meetings; there must have been five or six hundred of those boys there in those meetings. They came from every place, the boys from the outskirts of town, cold and ragged; the Jews and the Bohemians, all classes—some men from Euclid avenue sitting next to a boy from Orange street—and they did not look like material for an army. They sat there and they would sing "The Star Spangled Banner" with a quaver in their voices; would listen to the words that were said, and they presented rather a pathetic sight, a sight that to the observer would suggest that those men never would make regular soldiers. Last week I went down to Chillicothe with the Citizens' War Committee to present a stand of colors to the 331st regiment. We met the officers in charge—Gen. Perkins of the Regular Army (forty years), a soldier all his life; Col. Williams, who spent his life in the Regular Army, and all of those men, Regular Army officers of great experience—and I never in my life met men in business or professionally who were finer, better, abler men than those officers—they have charge of those 36,000 men. The commissioned officers—eighty-five per cent. were college men, mostly young men, captains and lieutenants, the kind of men of whom you are proud of, the kind of men you like to shake hands with, the kind of men who make happy homes, grand communities and a great nation. It was raining and it was cold; they turned out, the whole 331st Regiment, and those boys I had seen here at these meetings marched past, and they were real soldiers. They marched shoulder to shoulder, they drilled perfectly, and you couldn't pick the Euclid-avenue boy from the boy from Orange street.

That sight suggested something to me. It suggested to me that no matter how long this war lasts, no matter how much we must pay in money and blood and life, this war, when it is over, will be the grandest blessing we ever have had. It will be the elimination of caste; it will be the amalgamation of true, real citizenship. All of those boys, when they come back home, will be better men. They will make us a nation, a real nation, not of money-grubbers and dollar-chasers, but a nation of true, red-blooded, real Americans, and that is the great thing they are doing!

A little while ago a man would talk about the flag. He would refer to the colors, would make a patriotic remark and they would laugh at him. It was an unpopular thing to do. You would go to the theatres and they would play "The Star Spangled Banner," and some stood up and some did not. We were not patriotic; we had forgotten the glories of Ohio, the glories of the Western Reserve; we had forgotten our own ancestry, our own wonderful history, our own makeup. But it is a different story today. The great spirit of Americanism is seizing all of us. We all feel the same way. We feel that there is something intangible, something you cannot describe, some sort of a feeling that almost chokes you up when you think about it, and that is the new spirit of Americanism that is ennobling and glorifying every one of us.

We are all much the same. We all will do the same thing. We will do as President Wilson said today; we will declare war on Austria first, and then fight this war through until we make a democracy of the world and bring Prussiansim to its knees. And we will do all of that because in the old days we learned the traditions of the American spirit; we learned to love Barbara Fritchie and Paul Revere and George Washington. We learned to have almost a devotion to that flag. For after all, it is

Your flag and my flag, and how it flies today,
In your land and my land and half a world away;
Rose-red and blood-red, the stripes forever gleam;
Snow-white and soul-white—the good forefathers' dream.
Sky-blue and true-blue, with stars to gleam aright,
The gloried guidon of the day, a shelter through the night.

Your flag and my flag; and Oh, how much it holds!
Your land and my land secure within its fold!
Your heart and my heart beat quicker at the sight;
Sun-kissed and wind-tossed, red and blue and white.
The one flag—the great flag—the flag for me and you;
Glorified all else beside—the Red and White and Blue.

(Judge Day's splendid address was interrupted frequently by cheering and clapping, the audience responding heartily throughout.)

Some men "shoulder" their job; others "soldier" it. The first are lifters; the second, leaners.

You've seen a wagon deep in a muddy rut—"stuck," The leaner stays up on the load, lashes the horses, and shouts and curses—while the wheels only sink deeper!

But the lifter climbs down, combines the heave of his shoulder with the pull of the team—and out comes the wagon.

When you're stuck in a rut, instead of cracking the whip at circumstances and cursing fate, why not get down off the load, put your shoulder to the wheel and lift.—MACK

PATRIOTIC ADDRESS*

BY GEORGE SCHNEIDER, CLEVELAND, OHIO

(SECRETARY, CLEVELAND ATHLETIC CLUB)

GEORGE SCHNEIDER

I SEE SOME OF YOUR BOYS here in uniform. I cannot face death at the front or carry a rifle, but I have been shooting at the kaiser oratorically since last April. I have had my dining room equipment looked over and tampered with a few times, and I am glad to address this number of dentists in these chairs. I wish the chairs were not so comfortable and that you had a foot or two of nasty rubber in your mouths, for I am going to try now to get back at you. Sometimes you cannot live up to the specifications a toastmaster or chairman sets for you, but a conversationalist is a good deal like a dentist—he often can put up a bluff and get by. When I play the small towns I can do all right, but before a lot of you wise ones I must deliver.

I went to Florida last winter and I heard a colored preacher down there tell a story about a colored justice of the peace. This justice had a darky before him for being drunk. The old justice had a plain pine table and a large, thick book in front of him, and he put on his glassses and he said, as he was looking over the pages of the book:

"Sam, how often have you been in here, suh?"

"I've been here seven times in fouh weeks."

"You're drunk all the time. Let me tell you, I must make an example out of you for the good of the community, for the good of your family, the town and yourself."

He ran a finger down the pages of his big thick book and he said: "I will fine you $17.50, and you go to jail until you pay the fine."

Sam and his friends hustled around and they got the $17.50 and laid it on the table—in nickels, dimes and small change—and walked out.

When Sam got out one of his friends caught hold of him and said: "Why didn't you argufy with the jedge? I never would pay that money! Just think—$17.50!"

"Why," answered Sam, "you fool nigger, I've been up before that old fellow seven times in fouh weeks; I know him. He can't read and he can't write. All he can make out is figures. That is no law book he's got there; that's a Sears-Roebuck catalog. When he fined me, running his finger down those figures, he was in the baby-buggy department. If he had ever got into the automobiles, I would have been in jail for life."

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*An address before the Ohio State Dental Society, Cleveland, December, 1917.

I want to talk on "Practical Patriotism." That is my text. How many of you ladies and gentlemen have stopped to think that while we have been at war since last April, only in the last few months the majority of our people are thoroughly realizing this fact; are realizing that we have entered upon the most serious and eventful period of the nation; that we owe support to our government; that we owe something to mankind in general? Up to the time we went into this war the Europeans accused us Americans of being a nation of money grubbers, and from their viewpoint we must admit they had some reason for that accusation. For years before we went into this war we capitalized that conflict. We were nursing opulent war babies, declaring extra dividends, issuing watered stock—all on the strength of the fact that we required the European nations to pay an exhorbitant price for food and munitions. For three or four years the universal greedy pursuit of financial gain had become the all-powerful influence in our lives. It was trampling in the mire all sentiment and patriotism. We have just come through an era of frenzied finance. We have been addicted to extreme extravagance, living in luxury, self-centered and selfish in the pursuit of our individual interests and happiness.

When the war first broke out in Europe we were terrified at the terrible accounts of that great conflict. Our emotions were stirred to the utmost depths as we read of men in thousands slain on the battlefield, of entire sections of country laid waste and devastated. Our hearts were moved to sympathy and pity as we read of thousands of young men who left for the front, sound and well, and returned maimed, wounded, crippled and blinded; as we read of homes destroyed, of the haggard faces of red-eyed women and the white, peaked faces of starving little children. But as the war went on month after month, none the less vicious nor the less terrible, none the less exacting of its horrible toll, the fact that it was three thousand miles away from us, engrossed as we were in the pursuit of the almighty dollar and our own individual interests, we became calloused and hardened; we sometimes read the detailed story of some particularly important battle, but the war did not have the same effect on us as before. In our own selfish, complacent way we were smug and confident in the knowledge that our own country was at peace, that we were prosperous and happy. We became engrossed, as we always had been, in our own selfish and sordid way of living. It has been only in the last few weeks that we are beginning to realize that we ourselves are actually at war. Do you know what it took to bring that to us? It was when we heard the strains of fife and drum in every village (and we will hear it perhaps for two, three or five years), when we began to see our own flesh and blood, the flower of our own nation's manhood, our own husbands, sons and brothers, nephews and sweethearts, leave to take part in this great conflict, it was only then that it was really brought home to us—this war that before had become so common-place.

It is time we began to realize the serious condition we are in. It is time we began to realize that our country is calling upon us tonight to answer that roll call that we must learn to answer and answer promptly in every way. It is time every man and woman here makes up their minds to one thing, and that is that your government must have your co-operation along such lines as it is deemed best in the preparations our government is carrying on. Patriotism not only is love for that flag, but practical patriotism is the subservience of our personal interests, comforts, resources and convenience to our country's call for duty, service and sacrifice. And I want to say to you that now is the time when we must forget sectionalism, politics, partisanship, all those things must be swept into the discard; labor and capital must forget their differences and work harmoniously. This not only is a conflict of armies and navies, of battles on land and on sea, in the air and by submarine, but it is a war of finances, a war of electricity, a war of chemicals, of manufacturing, of mining, of agriculture; every source of our country's resources and production fused and co-ordinated into a single purpose—the defense of our nation, and the principles that flag always has stood for.

We not only have an army and a navy that we must prepare, but we have an entire nation of men and women that we must train, and every man must play the part for which he is best fitted. This is not a war where they number their armies by tens of thousands of men or hundreds of thousands of men, but it is a war where they number armies by tens of millions.

I want to say a word to the people who once were pacifists. I know there are none here now. Those people who were for peace at any price want to remember one thing: Our country is based on the principles of democracy and when our government, by an overwhelming majority, declared our country had gone to war with Germany, then it was a closed incident and we should be back of our government and President Wilson to a man. (Applause.)

We have heard a great deal about our foreign-born people. My father and mother came from across the water. There was a lot of doubt where the foreigners stood, Germans and Austrians and Bulgarians. But I want to say this to you, that experience has shown that the majority of men of foreign birth are among the most substantial and thrifty of our people. They are identified with our various industrial, commercial and civic activities, and the last seven or eight months have shown us that those men appreciate what our country has given them. They recall the wide-spread arms of Uncle Sam welcoming them to this land of promise and liberty, and an overwhelming majority of them will prove their allegiance to the principles and ideals which first attracted them to our country. We did not ask them to come. Why did my father and mother of all the countries in the world, pick out the United States to live in? I will tell you why: My daddy used to take me on his knee and he would tell me why they came. He would say: "I came to this country because I wanted you and your brothers and sisters to have opportunities that I never had. I wanted you to have an opportunity for education and advancement, an equal chance for life and liberty such as we could not get over there."

If there is a man or a woman in our city or in the whole United States who does not appreciate the blessings and benefits derived from residence and citizenship in this country, who love Germany or Austria or England or France or Italy or Russia more than they do Uncle Sam, the sooner they beat it back to where they came from the better off they and we are going to be. (Applause).

We may be a country of free speech, but I want to say to you, at times like this, free speech soon assumes the wings of treason; and any man at this time who is guilty in any way of giving utterance to anything that may interfere with our government's policies and activities, is absolutely guilty of treason; and you know what the punishment for that is.

We have men in every community, ungrateful fanatics, many of them soap-box orators, who never paid a nickel of taxes, men who always are disgruntled and dissatisfied, many who were run out of their own countries. If any of that type of men work against our government in the way of interfering with the activities which lie before us, the sooner our government—and I know they will, in the next month or two—invite them to a nice, quiet, sociable sunrise firing party, the better off we will be.

The average American has been noted for his good nature. Up to this time we have shown a tolerant carelessness at the antagonistic expressions and activities of pro-Germans, but right now good old American blood is going to be shed over there in France and Belgium and Italy, and the American who has been listening to this talk of pro-Germanism and peace will awaken and take that man by the throat. The sooner they begin to realize that we have only one people here, that hyphenated Americanism is a thing of the past, that if that old flag is good enough to live under, it is good enough to fight for, the better it will be. We have just begun to realize (I don't know why we were blind to what Germany had been doing for twenty-five years) we realize now within the last eight months that in 1892 the kaiser and the militarists had spies scattered in every country; that they were teaching the children in the schools the best way to serve God was to be a German; that they were inculcating in their people the notion that the best way civilization could be furthered was by the infusion of German blood into all nations; that the kaiser put himself on a par with the Great Deity, but mentioned his name ahead of God. We realize that for twenty years Germany's preparation went on. What for? For the purpose of protecting her own country against invasion? No. Her sole idea has been the forming of an impregnable military and economic unit, stretching from the Black Sea to the Mediterranean, from Hamburg to Constantinople, controlling the Aegean and the Baltic Seas, taking a slice out of the middle of Europe; and not only having middle Europe under her dominion, but eventually forming a tremendous world empire. You will find those are the identical lines held by Germany and her allies today, by the armies of Austria, of Turkey, of Bulgaria, all those armies being under the direction and supervision of German officers.

For three years, while we sat still, those other nations attributed this to the fact that we were neutral and at peace because of selfishness, that we were recalcitrant to our duty to our country and humanity, blind to those principles we brag so much of, due to our eagerness for commercial prosperity. It took a ghastly list of happenings to awaken us to the fact that we must go to war with the Hun. Then we awakened to the brutal invasion of Belgium, the laying waste of that beautiful land, the killing of thousands of her brave soldiers who were doing nothing but protecting their own homes against the invader; the driving of many of them into slavery to serve in the mills and fields of Germany, while the women whom they loved just as much as you and I love ours, were left behind to the dastardly purposes of the invader. We began to note the wanton destruction of great universities and world monuments that had stood and been revered for generations, the sinking of ships that plied the seas unarmed, and without mercy, and the particularly gruesome instance, bringing this barbarous form of warfare home to us, being the sinking of the Lusitania, the cold-blooded murder of scores of innocent American men, women and children. We began to see the results of the alliance between so-called Christian Germany and the Mohammedan Turk, as we heard of the massacres of hundred of thousands of Armenians, driven into the deserts to starve, while the women were left to be ravished—and we saw all those things without a word of reproach.

We began to recall the bombarding from the skies of unarmed cities, with no apparent purpose but the killing and the maiming of women and children as they lay slumbering in their beds; we began to recall the use by the Hun of flaming oil and poisonous gases, the sinking of Red Cross vessels bearing the sick and the wounded, notwithstanding the flag prominently displayed; the sinking of American steamers carrying food and clothing to the starving of stricken Belgium; and finally we had brought home to us the proof that in the hour of its most friendly assertions to us, German intrigue was using vast sums of money and a horde of spies to bring about strife and revolution in our own land, as well as conspiring with Mexico and Japan for attack on our country. It was only after we got into the war, however, that we began thoroughly to realize the fiendish inhumanities being practiced by the German armies. We began to learn things that made men's blood run cold, things that you cannot mention in a mixed audience; that even men can only talk about in whispers; we proved that Germany in the height of her power and progress had branded herself with barbarism; that Germany, no matter when or how peace may come, has sown the seed of hatred in the hearts of hundreds of millions of civilized people, *and never can win back their confidence and respect!*

Those atrocities we hear about, and there are thousands of them, were not committed in an hour of drunkenness or anger, they are the result of German so-called efficiency that has been developed to the highest point in devising atrocities cruel and fiendish for the sake of torturing poor old men, helpless women, young girls and little babies. We have absolute proof that the kaiser, in an address to his soldiers, said: "I want you to be more horrible than the Huns under Atilla, so that for a thousand years to come no enemy of Germany will even mention her name without shuddering." Then they wonder why we call them Huns and barbarians! They have given themselves the title. They have proven it is a just one. (Applause.)

Have you thought of the thousands of little children, eleven or twelve years old, maimed and wounded, their arms and legs cut off, blinded? We have them in this country, poor little shadows of childhood, the best argument against the ruthlessness of German warfare; children who never will know how to live, how to play, how to enjoy life as other children do.

We heard of the French and Belgian and English prisoners of war, hundreds dying with no effort to give them medical attendance; hundreds of thousands of prisoners huddled in huts of manure and straw, and made to sleep in the cold, compelled to struggle for fifteen or twenty hours a day in the labor pressed upon them, until they fell in their tracks, and then were kicked aside to die. We read of big men, emaciated and pale, who picked up the sand that soup had been spilled upon, licking the sides of their bowls, scraping up the crumbs in the bottom of anything to get a little nourishment. Those are only a few of the scores that absolutely have been proven.

Dr. Hillis, sent over as the head of a delegation, to find out the real truth, after being there only a few weeks, came back with ten thousand listed atrocities, every one backed by affidavits, actual photographs and letters and diaries taken out of the pockets of German prisoners and dead soldiers; of old men, seventy or eighty years old, lined up against the wall, made to dig their own graves, and shot down. He tells of village blacksmiths, with their hands placed on their own anvils and smashed, so that they could not shoe soldiers' horses; of one boy of fourteen, the male nearest of military age in his village, and after they had burned the house down, the Germans took him out and hung him to a pear tree. Then when the soldiers had gone to the next house the mother of the boy cut him down. In some way the Germans found out that he had been taken down and they went back, took this boy, poured oil on him and made a torch out of him and burned him to death before his mother's eyes. We hear tales of forty or fifty old men, of women and of children, driven into barns and houses and the doors locked, the place set on fire and then they shot them down as they tried to escape.

I heard a lady, a personal friend of the Queen of Roumania, who went about in the midst of her people, tell of poisoned candy dropped by German aviators over that Roumanian land, and her own five-year old son ate a piece of it and died in agony in his mother's arms. Of one village where twenty-five women of the best families in the village were stripped nude, and after being ravished were driven through the streets of their town with horse-whips.

I heard Harry Lauder tell of sixty of the Scotch Black Watch Regiment, one of the bravest regiments Great Britain ever had; sixty of those men going over the top and cut off by the enemy and captured, and all that night they were kept in a cold, drizzling rain, stripped to the skin, standing in the German trenches. The next morning they were told that they could go back to their own trenches, and they hadn't gone far across No Man's Land when German machine guns killed every one, and Lauder's own son helped to bury them.

I heard a man tell of two brothers in his own regiment who made a charge, and only one of them came back. The other one was not there. Early the next morning as the sun was coming up this brother in the English trench saw across at the German line one hundred yards away a cross of wood put up, and his brother crucified on it, alive. He picked up his rifle and shot his own brother dead, to end his suffering.

These are a few of the things that will make you realize the kind of nation we are fighting. I could tell you story after story so horrible they make me see red. We can't realize all of the things that are going on. At one hospital in France they have a thousand girls, not one over eighteen years of age, all in a delicate condition, the majority of them infected with horrible diseases, and eleven per cent. insane.

If, in the face of all these established facts, of this absolute lack of regard for the weak and the defenseless, this cold-blooded, reckless disregard of humanity, if there is a man here who says we should not fight to the finish, not only fight until we make the Germans ask for peace but until we *drive the barbarian down on his knees and make him beg for mercy,* HE IS UNFIT TO BE CALLED AN AMERICAN! (Tremendous applause.)

I don't want to be a crape-hanger, and do not want you to think I am a pessimist, but we are in a worse condition now than we realize. All you need do is to read that wonderful address of President Wilson's, published last night and this morning, and you can read between the lines that he realizes the critical condition we are in. Inside of six months from now you will be not only dentists, men will be not only bankers, and traffic directors, and presidents of railroads, and grocery clerks; they all are going to have just one business. We will have just one profession, one aim, one desire, one duty, and that is to win this war and win it as quickly as we can. Germany can be beaten, and I want to say to you she must be beaten, and we are going to be the nation that will lick her and make her like it before we get done with it.

There is nothing worse than trying to fool yourself. If you have stopped to realize real conditions, you know a lot of us Americans thought that all that was necessary to make Germany sue for peace was for us to announce that we as a nation had declared war on Germany. We haven't started yet. Germany and the Central Powers she has with her, by their invasion of Belgium, France, Servia, Poland, Roumania, Italy and Russia, in the last twelve months alone has acquired food supplies, minerals, petroleum, all things they need, and are better off in that respect than they have been at any time in the last fifteen months. Up to the last few months, when we commenced putting an embargo on things going to the little nations like Holland, Denmark, Sweden and Switzerland, they absolutely were forced to sell Germany everything they had of not only their own production but the things they bought from us, for fear of having war declared on them and being wiped out.

When we read of an occasional little victory on the west, do you know that there are French and Belgian and English troops that have been in the trenches on the western front, in the same trenches for twenty-three months? That is what they are doing for us. And when Gen. Byng drives into the line six miles and takes a hundred square miles of territory, we think it a great victory. Our memory must be very short, because we remember but a few days ago of the Germans taking two thousand square miles in Italy and capturing 160,000 Italian prisoners. When Germany backs up they have their trenches in the rear prepared and their roads ready, and they can retire rapidly, whereas our men must go over roads full of shell craters and of wire entanglements and fallen trees, and they must build their own roads to bring up their heavy batteries, commissary departments and everything else. Every time Germany evacuates a little territory, when she backs up she chops down every tree, poisons the wells, blows up every building, not a stone is left on top of another; she doesn't leave enough sustenance to keep a grasshopper alive—and yet we haven't disturbed a single blade of grass in Germany. During the last twelve months Germany has enrolled a million additional men for military service. They may be only sixteen years old, or they may be sixty; but they have a million more men to fight.

Have you thought of this submarine menace, and of the losses that we cannot replace in the time it has taken to destroy the ships; of the million or more of prisoners that they have making munitions to shoot down their own men with; that Germany has had the advantage of twenty years of effective preparation; that all of her people are cooperating along the line of conservation and economy, making unheard-of sacrifices in their fight for existence, and incidentally they are draining every nation with which they are at war?

Up to this time this war has been kept three thousand miles away, not because of anything we have done but because France and England and Belgium and Italy have been giving their hearts' blood and fighting the world's fight for humanity, democracy and peace for you and me, while we sit here in perfect safety and comfort. Those are the things we must realize.

Suppose before we can get over there and help, the Germans achieve a really decisive victory; what do you suppose is the next country they will reach for? They have been insanely jealous of us for twenty years in a commercial way, and in the last nine months they have learned to hate us as being the only factor that has stood between them and victory in Europe. It means that every man and woman in this country must awaken to the real situation we are in. Every man and woman here is enrolled under those colors, just as much as you are who are wearing the khaki, just as much as those men who are in the navy, or in the Rainbow Division under Pershing today. Every man and woman is in active service.

What would you think of one of our boys who deserted under fire? He must be shot. How many deserters have we had up to this time in our own lines? From tonight on realize this: I don't care what you are asked to do, *do it*. You dentists can to a wonderful work. The government realizes you are as important to the welfare and success and efficiency of our army and navy as any other factor, and when I see that service flag with those stars on it, I want to salute it. That means something. I see some of you boys out there in khaki. You are starting in to do your bit. I understand the Cleveland dentists are equipping a dental ambulance, but you have only started. Before we get through with this conflict we will not only do our bit, but we must do and *give until it hurts*, and we are going to do it, cheerfully and gladly, too. Don't wait until two or three months from now when the long fatality list confronts you in the paper day after day, but cooperate from now on, and any time you are asked to give to any good cause, the Y. M. C. A., the Red Cross, or anything else, dig down deep. We haven't made any sacrifices yet. Our war debt is only four per cent. of our country's resources; we haven't started.

I have given you the pessimistic side. I want to show the other side. They tell us that Paul Revere was a dentist. I want you all to be Paul Reveres. We need one hundred thousand Paul Reveres to ride broadcast throughout our country, through every city and village, down every highway and byway, sounding the alarm to rally around that flag, and while we may have been a little tardy in realizing the seriousness of the situation that confronts us, I know our people will respond, as they always have responded in the past. With the selective service draft, ten million men are picked, from all walks and stations of life, the rich and the poor, without distinction and discrimination—an army of true democracy. Tonight two million men are enrolled or over there in service, or going through the strict routine of camp work, to go over as soon as ready. If we can get a million of those boys over there by the first of next May, they will give the kaiser and his barbarian Huns a taste of old-fashioned hell and all the trimmings that go with it. You can bet on that!

We may have been a nation of commercialists up to this time, and the fact that we have had so many years of peace may have caused our martial spirit to slumber; but I know the American people, and once they are aroused they will show the nations of the world, friendly or otherwise, that we not only love our country and are willing not only to make sacrifices of resources, but we will give our hearts' blood for it, and that flag and all the ideals it ever has stood for. We will show them that while the martial spirit has been slumbering, a few more messages like President Wilson's will set the spark ablaze and the old fighting spirit of Lexington and Concord, of 1812, of Appomattox and Gettysburg, of San Juan Hill and Manila Bay, will assert itself.

We may have only a quarter of a million over there now, but they won't back up an inch. They will look the Huns in the eye; it will be give and take, and if they back up it will be only because they have some German prisoners to take back with them.

Can you imagine what it meant to the troops of England and Belgium and France and Italy to see the Red, White and Blue unfurled over there? Can you imagine their feelings when they realized that the United States was on the ground, that the days of diplomatic notes and conversation had gone by, that our nation was backing up our

President and that we were going to fight this out to a finish? Do you realize what it means to have our boys at Camp Sherman and every where else know you dentists are with them in every way? We want to let those boys know when they start across the sea that we are back of them to a man. The best message we can give them is to show we appreciate the sacrifices they are making. They have given up their positions; they have left their homes and families; they are going into the trenches with mud and water up to their waist, that they are going to live and sleep in those trenches by day and night; that they are going to charge across No Man's Land, not knowing who is coming back. They are prepared to endure any form of hardship, ready to give up their very lives for our country and the cause of liberty, justice and humanity. Let us back our boys to the limit and let every man and woman make up their minds they are going to show their practical patriotism every day; that winning the war is first and fixing teeth is second. Let us realize we must have team work; that every man and woman must do his bit in everything that is asked, everything that suggests itself. Prove your allegiance, loyalty, patriotism, prove your appreciation of all the blessings we have enjoyed in the last fifty years, show the world we are real Americans, that the old fighting spirit of '76 is not dead. Let us take inspiration from the sacrifices made by our forefathers; let us live up to traditions and ideals that those men fought and died for. Let all America be ablaze with patriotism; let our entire nation be aligned man to man, shoulder to shoulder, serving and acting in unison, to maintain and defend the honor and dignity of our country and flag—the flag that, with the help of Almighty God and with a just cause to fight for, *never has touched the ground in defeat and NEVER WILL!*

(The audience rose as one man and cheered at the conclusion of this masterly address.)

What dumfounds us is how a woman can talk a blue streak and knit a soldier sock, and never get "yarns" mixed.—*Memphis Commercial Appeal.*

REMOVAL OF THIRTY DENTICLES FROM ONE BICUSPID SOCKET

BY BUNDY ALLEN, M. D., IOWA CITY, IOWA.

ROENTGENOLOGIST, UNIVERSITY HOSPITAL, STATE UNIVERSITY OF IOWA, COLLEGE OF MEDICINE

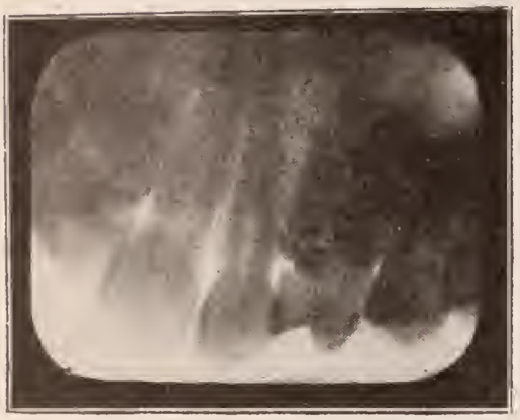

Fig. 1.---Collection of denticles in upper right bicuspid region.

May 29, 1917, a woman, aged 23, called my attention to a slight prominence of the gum buccally to the upper right bicuspid region which had not produced any symptoms other than the elevation of the tissue. *Figure 1* is a roentgenogram of the upper right bicuspid region showing the presence of a collection of denticles. The patient was referred to Dr. John Voss of Iowa City, Iowa, who extracted thirty denticles from the first bicuspid socket (*Fig. 2*). All teeth were present and occlusion was perfect, excepting for the third molars, which had not erupted.

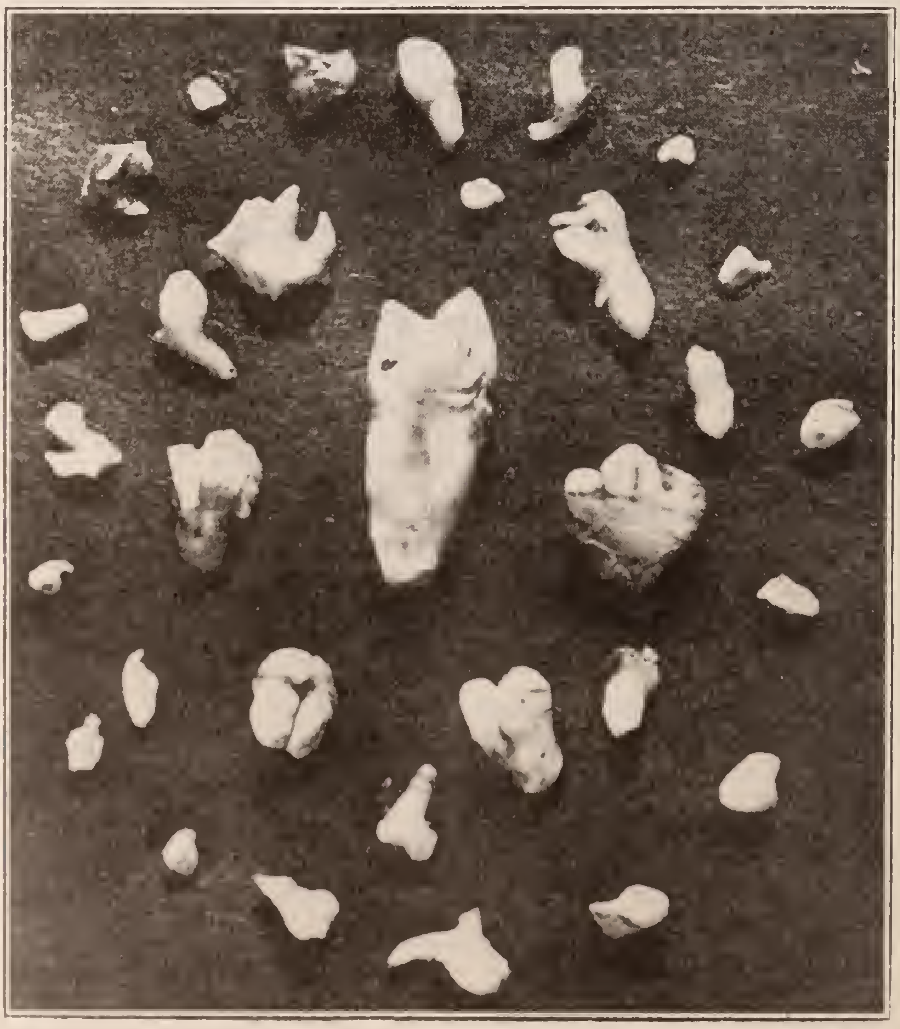

Fig. 2.—The thirty denticles removed from the bicuspid socket.

CORRESPONDENCE

A CORRECTION

BY DR. MORRIS MESTEL, NEW YORK.

Apr. 10, 1918.

Editor Dental Summary:

DR. FURNAS, whose article on "Root-Canal Technic," appears in The Summary for January, 1918, is apparently well read and well versed on dental history and literature, particularly relating to the above-mentioned subject.

In his article he (Furnas) freely quotes Callahan; Ottolengui, of N. Y., and Buckley, of Chicago, receive their share of commendation for their originality along this line.

To use Dr. Furnas' statement:

> "It was not until December, 1893, that this great obstacle was finally overcome, when Dr. J. R. Callahan, of Cincinnati, presented his famous paper on 'Sulphuric Acid for Opening Pulp Canals,' before the Ohio State Dental Society. This was, up to that time, and has remained, the greatest step forward in the technic of pulp-canal filling."

It is surprising to note, that while Dr. Furnas is crediting Callahan, Ottolengui and Buckley with their originality, he has failed and overlooked to mention the Pioneer and Father of Modern Root-Canal Technic, Meyer L. Rhein, of N. Y., who as early as 1883 originated this modern method, which up to the present day, without any changes, has remained the standard procedure.

While he (Rhein) made no changes in his original technic, he added several improvements, viz., 1893, Schreier's sodium and potassium; 1896, Ionization originator. See *Cosmos,* September, 1911.

He is also the inventor of various beautiful little instruments, popular in root-canal procedure, bearing his name.

Ottolengui, in *Items,* Jan., 1917, "Around the Table," gives due credit to the exponents and originators of Modern Root-Canal Procedure by naming it "Rhein-Callahan Method" and their followers "The Rhein-Callahan faction."

In justice to Dr. Rhein, who is not seeking personal glorification at a great personal sacrifice, for the benefit of mankind, and the healing profession that is spreading the gospel of his root-canal teachings, kindly give this correction space in your publication.

24 Avenue A.

SUGGESTIONS

Conducted by F. R. Chapman, M.S., D.D.S., Columbus, Ohio

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.)

Easy Method of Removing Regulating Bands

To remove regulating bands or crowns, grasp the band with forceps and squeeze with firm pressure, repeating the process around the tooth if possible. This will loosen the cement and may even expand the band so that it can be easily removed.

—*F. W. Stephan, Dental Review.*

Polishing Material for Dentures

When the denture has been filed and dressed with the scrapers, the surface may be smoothed very rapidly by the use of equal parts of pumice, emery and silex of medium fine grit. By uniting these powders with equal parts of beeswax and hard oil the spattering and dust will be avoided and polishing will be a comparatively clean proceeding.—*F. W. Frahm, Pacific Dental Gazette.*

Vulcanite Tooth Replacement

Several days ago the writer was shown a rather unique method of replacing a broken tooth in a vulcanite denture. After selecting a tooth of the right mold and shade, it is fitted into the recess of the broken tooth, with clearance for the pins, but without cutting the pink vulcanite. Then a horse-shoe shaped loop several millimeters deep is cut in the vulcanite lingually to the tooth, leaving an island at the base sufficiently strong to resist a part of the strain that naturally will fall on this tooth. Now a small wire is twisted around the heads of the pins of the tooth and fitted into the horse-shoe shaped groove. Lastly the tooth and wire are fastened and the case finished by sealing the repair work with zinc phosphate cement. This makes a rapid, easy repair that will last from six months to several years.

—*F. W. Frahm, Pacific Dental Gazette.*

Cement and Gutta Percha Fillings

If a cavity for a cement filling is properly prepared and the cement given lots of time to "harden," a cement filling is a wonderful filling. "What is the *right* or *best* way?" Why ask? *You* know.. Simply *take your time,* trim off the very frail edges, smooth off the margins. Alcohol and dry it, then oil of cloves and dry it, and you will be saving teeth. And that's your job. Gutta-percha fillings will be most effective if the cavity has solid flat walls and right angle edges—and—cleared with alcohol and oil of cloves and thoroughly dried. Cement must have lots of time to set.—*Homer Almm, Dental Review.*

Carving the Occlusal Surface

It must be borne in mind, that all teeth should not be carved up to the same form; what is a correct occlusal surface for a boy of fourteen is not at all suitable for a man of sixty. Occlusal carvings should be based on the other teeth, or the lines of occlusion, rather than some ideal taken from the dental laboratory.

—*A. E. Webster, Oral Health.*

To Cut Down Occlusal Surfaces

Two knife-edged stones, side by side, on one mandrel are very quick in cutting down the occlusal surface of a molar for a crown.

H. E. Noble, Commonwealth Dental Review.

To Prevent Nausea in Impression Taking

Paint the soft palate with the following solution: Cocain hydrochlorid, 0.25; menthol, 0.10; phenol, 1.00; distilled water, 50.00.

M. A. Horwitz, Dental Review.

Ammonium Flurid

This solution under many trade names sold to dentists for the purpose of removing collections of tartar and stains from teeth, will do about all that the labels on the bottles claim, and this much more: It will dissolve lime accumulations on drinking cups and cuspidors; dental cements; synthetic fillings; tooth structure, both enamel and dentine.

If, as I pointed out some time ago and which I still believe, a substance will destroy tooth structure as rapidly as this material, it is reasonable to conclude that it will aid in the advancement of conditions toward a beginning for caries, especially in liable areas of teeth in persons susceptible to tooth decay.

S. A. Allen, Nebraska Dental Journal.

Dentin

I never expose freshly cut dentin to the fluids of the mouth when I can help it, and whether I do or do not I treat it to a touch of oil of cloves. Treating the cavity with alcohol followed by oil of cloves warmed with a puff of hot air from your chip blower, and the cavity stopped with gutta percha until the patient returnes, will prevent the sensitiveness sometimes complained of after setting an inlay. Not only that, pulps are not so likely to die.—*Homer Almon, Dental Review.*

A Good Mouth Lamp

A pocket searchlight with a long stem light similar to a Cameron light placed in it gives a very effective light for examinations of the teeth where there is no electricity or where the dentist has no better light. It costs but a trifle. It is also very effective for carrying in a case for a house examination.—*G. H. Henderson, Dental Review.*

To Sterilize Dentin

Before inserting a filling or cement base in a tooth in which the pulp is alive, evaporate a 15 per cent. solution of thymol in alcohol in the cavity. The thymol will penetrate the tubuli and sterilize the dentin. This will avoid irritation of the pulp, which may cause secondary dentin, pulp nodules, or even death to the pulp.

—*A. de Vries, Dental Review.*

Casting Clasp Gold

Casting gold "E" can be cast perfectly in a *cold* mould, the resulting casting having sharp edges, and remarkable freedom from flaws and pits. It is very strong and tough, possesses spring and resiliency and best of all, *holds* that spring under use and under soldering conditions. It appears practically immune to temperatures below the melting point of pure gold. Other alloys tried were disappointing in this respect, as they either became extremely brittle under soldering heat, or else softened considerably and lost their desired elasticity. In color, the "E" gold is a yellowish gray, hardly distinguishable from platinum, and its texture being very dense, it takes and holds a fine polish, and like platinum is unaffected by oral fluids. It will bend to a limited degree, but is not meant to be bent like other clasp metals.

Formula

Gold	65.0	
Silver	4.0	
Copper	9.0	
Platinum	8.5	21
Palladium	12.5	
Zinc	1.0	
	100.0	

Norman B. Nesbett, Journal Allied Societies

SOCIETY·ANNOUNCEMENTS

National Dental Association

GENERAL CLINIC

Arrangements are sufficiently advanced to promise the members of the Association that the General Clinic will be one of the great features of the 1918 meeting.

In conference with officers of the National Dental Association, the Committee in charge of the General Clinic carefully considered the nature of the clinic to be presented this year. After trying for the past few years new features in conducting the Clinic Program, it is the belief that a greater number will be served and benefited by holding a General Clinic, grouped into Sections:—namely—Operative, Prosthetic, Crown and Bridge Work, Orthodontia and Prophylaxis

To make it National in character, the President, of the different State Societies, was requested to appoint two Clinicians and two associates from his State Society.

Up to date, thirty-nine State Societies are represented and the remaining nine will be represented before the publishing of the Official Program.

Far away Alaska is sending two and two associates, and to make the Clinic more than National, in fact an allied affair, the Canadian Dental Association has promised ten of the best Clinicians in the Dominion. In addition, there will be a few Unit Clinicians who will demonstrate principles that require more than two men.

It is safe to say that this Clinic will be unique in the sense that every man on the program will either be present or be represented by his associate.

Don M. Gallie,
Chairman General Clinic.

Northern Ohio

The annual meeting of The Northern Ohio Dental Association will be held at Toledo June 6th, 7th and 8th. Program will be announced later.

Ohio State Board

The Ohio State Dental Board will hold its regular June examinations the week of June 24th at Columbus, Ohio. The Practical the first three days of the week, at the Dental College, and the

Theoretical the last three days of the week, in the Armory on the State University Campus. Preliminary Practical Examinations will be given at the Ohio and Cincinnati Dental Colleges, Monday, Tuesday and Wednesday, May 20th, 21st and 22nd. At Columbus Thursday, Friday and Saturday, May 23rd, 24th and 25th. At Cleveland June 3rd, 4th and 5th. R. H. VOLLMAYER, *Secretary,*
Nicholas Building, Toledo, Ohio.

Indiana State Board

Next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, June 17-22, inclusive. Applications and other information may be obtained by addressing H. C. McKittrick, Secretary, Indianapolis, Ind.

Michigan State Board

The next meeting of the Michigan State Board of Dental Examiners will be held at the dental college, University of Michigan, Ann Arbor, Mich., June 17 to 22, inclusive. Applications and other information may be obtained by addressing B. S. SUTHERLAND, *Secy.,*
Owosso, Mich.

Kentucky State Dental Association

The next annual meeting of the Kentucky State Dental Association will be held at Lexington, Ky., June 13-14-15, 1918. An "amalgam program of special interest." Address all correspondence to Dr. W. M. Randall, Secy., Louisville, Ky.

New Mexico State Dental Society

The next annual meeting of the New Mexico State Dental Society will be held at Albuquerque, June 20-21-22, 1918.

A good program of special interest has been prepared. A cordial welcome will be given all ethical members of the profession.

J. J. CLARKE, *Secretary*
Artisia, N. M.

Nebraska Board

The next regular meeting of the Nebraska State Board of Dental Examiners will be June 17- 8-19-20-21, at Lincoln, Nebraska.

Yours truly,
S. A. ALLEN, *Treas.*

State of Vermont Board of Dental Examiners

The next meeting of the Vermont Board of Dental Examiners for the examination of candidates to practice in Vermont will be held at the State House, Montpelier, commencing at 2 P. M., on June 24th, 1918 and continuing for three days.

To be eligible for examinations a candidate must be (1) twenty-one years of age, (2) a graduate of a high school of the first class, and (3) of a reputable dental colledge.

Applications must be in the hands of the secretary not later than June 15th. For further information apply to

HARRY F. HAMILTON, *Secretary*
Newport, Vermont

National Association of Dental Faculties

The next annual meeting of the National Association of Dental Faculties will be held in the Green Room of the Congress Hotel, Chicago, Ill., August 2d, at noon. The executive committee will meet at 10:00 A.M. on the second. The meeting will continue through August 3rd.

CHARLES CHANNING ALLEN, *Sec.*,
N.W. corner 10th and Troost, Kansas City, Mo.
Care K. C. Dental Col.

Tennessee State Dental Association

The fifty-first annual meeting of the Tennessee State Dental Association will be held in Nashville, Tenn., June 17, 18 and 19, 1918.

GEO L. POWERS, *Sec.*,
Paris, Tenn.

North Carolina State Dental Society

The next annual meeting of the North Carolina State Dental Society will be held at Wilmington, N. C., June 19-21, 1918. Headquarters, Oceanic Hotel.

W. T. MARTIN, *Secretary*,
Benson, N. C.

South Carolina State Board

The annual meeting of the Board of Dental Examiners in the state of South Carolina will be held at The Jefferson, Columbia, S. C., beginning promptly at 9:00 o'clock, Monday morning, June 24th, 1918. All applications must be in the hands of the secretary by June 14th. Application blanks and full information may be obtained by addressing

R. L. SPENCER, *Secretary*,
Bennettsville, S. C.

Georgia State

The semi-annual meeting of the Georgia State Dental Society will be held in Atlanta, Ga., June 12, 13 and 14. This society will celebrate its fiftieth anniversary.

Florida State

The Florida State Dental Society will hold its next annual meeting at the Atlantic Beach Hotel, Atlantic Beach, Fla., on June 20, 21, 22, where fishing, golfing and surf-bathing are unsurpassed. A fine program is being planned. All ethical practitioners of this and other states invited to attend. For further particulars address D. D. Crews, D.D.S., secretary, Fort Myers, Florida.

Pennsylvania State Board

The next examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Wednesday, Thursday, Friday and Saturday, June 12, 13, 14 and 15, 1918.

The examination in Practical Work will be in the Evans Dental Institute, 40th and Spruce streets, Philadelphia, and the University of Pittsburgh, Pittsburgh, on Wendesday, June 12th. The examination in operative work will be held at 8:30 A.M., and the Prosthetic Work at 1:30 P.M. Applicants are required to furnish all instruments and a patient for the operative work. The theoretical examination will be held in Musical Fund Hall, Philadelphia, and College of Pharmacy, Pride and Bluff streets, Pittsburgh, beginning at 9:00 A.M. on Thursday, June 13th.

Application papers can be secured from the Department of Public Instruction, Harrisburg.

ALEXANDER H. REYNOLDS, *Sec.*,
4630 Chester Ave., Philadelphia.

West Virginia State Board

The annual examination of candidates for license to practice in the state of West Virginia will be held at Parkersburg, W. Va., June 25, 26 and 27, 1918. Blanks and information will be furnished on application to the undersigned.

H. H. SMALLRIDGE, *Secretary*.

Texas State Board

The next regular examination of the Texas State Board of Dental Examiners will be held in San Antonio, Texas, beginning June 17th, 1918, at 9:00 A. M. No diplomas exchanged; no reciprocity.

The application fee of $25.00 should be in the hands of the Secretary not later than June 12th. For further particulars and application blanks address

HARRISON B. CAVE, *Secretary*,
810-14 Wilson Bldg., Dallas, Texas.

Tennessee State Board

The Tennessee State Board of Dental Examiners will hold their next meeting on June 11-15, inclusive, at the Hermitage Hotel, Nashville, Tennessee. W. G. HUTCHISON, D. D. S., *Secretary*.

Program for The Section on Stomatology of The American Medical Association, June 11-14, 1918

Chairman's Address——————Dr. Frederick B. Noyes, Chicago

1. Chancre of the Lips Following Injury with Dentist's Emery Disk, Dr. Adelbert M. Moody, Chicago
2. An Analysis of Two Hundred Cases of Malignant Diseases in the Oral Cavity by Electro Thermic Methods, or in Combination with Operative Surgery, X-rays or Radium——Dr. William L. Clark, Philadelphia, Pa.
3. Treatment of Epithelioma of the Jaws and Cheek, with Heat and Radium, Dr. Gordon B. New, Rochester, Minn.
   Discussion Opened by Dr. Albert T. Ochsner, Chicago, Ill.
4. The Lipoids of Tumors of the Dental System, Dr. Kaethe W. Dewey, Chicago
5. The Genesis of the Epithelial Debris in the Peridental Membrane, Nasmyth's Membrane and the Granular Layer of Tomes, Dr. Eugene S. Talbot, Chicago
6. Additional Roetgenographic Studies of Infections of the Maxillary Bones, Dr. Arthur D. Black, Chicago
7. Microscopic Studies of Diseased Peridental Tissues, Illustrated by Stereopticon——————Dr. Edward H. Hatton, Chicago
8. Absorption of the Roots of Teeth——————Dr. Herbert A. Potts, Chicago
9. Longitudinal and Transverse Sectional Views of the Accessory Sinuses of the Human Cranium, Cut-Parallel and at Right Angles to the Nasal Septum——————Dr. Geo. Edward Fell, Chicago
10. Fractures of the Bones of the Face, with Complication, Dr. Vida Latham, Chicago
11. Fractures and Dislocations of the Jaws, Dr. Chalmers J. Lyons, Ann Arbor, Mich.
12. A New Surgical Procedure for Operating in Cases of Suppurative Gingivitis with Alveolar Involvement——Dr. Arthur Zentler, New York City
13. Neuralgia Dentalis——————Dr. Kurt H. Thoma, Boston, Mass.

DR. FREDERICK B. NOYES, *Chairman*
DR. EUGENE S. TALBOT, *Secretary*

The Officers of The Section cordially invite those who are interested in the program to be present and take part in the discussions.

We are prepared to take care of thirty or forty cars during your convention, at a special rate of 75 cents per day, providing they notify us of their identity as a member of your Association.

DOWN TOWN GARAGE,
A. J. Bemmer, Mgr.,
Michigan Blvd. and Eighth St.

One thousand cars can be parked in Grant Park (on the Lake Front) free. The City of Chicago furnishes policemen to watch these cars.

J. P. BUCKLEY, *Chairman,*
Publicity Committee.

Preparedness League of American Dentists

News and Notes

COMMUNICATION FROM THE PRESIDENT

Who should receive the services of the members of the League? Every worthy man within the draft age whether he may or may not be in the service of his country at the time.

Let us forget all but the one thought—that we must do our utmost to help strengthen our great National Army. We must help make fighters to protect our flag and do it NOW. Tomorrow may be too late.

One of our members recently arose at 3 A. M. and worked until 5 that one of "our boys" might go away in comfort. It is noble work and thousands of instances similar to this one might be related. The pride we feel in the way our profession is meeting the crisis cannot be expressed in mere words

Every man you make dentally fit will fight for you in France.

Have an army of your own.

ALL LEAGUE SERVICE MUST BE FREE

It is well, perhaps, at this time to remind our members that all dental service rendered in the name of the League must be free. There can be no deviation from this rule without nullifying the great principle upon which our organization is founded.

We are rendering an inestimable service to our country and when we shall have completed our work, let it be said that we gave freely, gladly and with true patriotic spirit.

THIRD ANNUAL MEETING OF THE LEAGUE

Our third annual meeting will be held on August 7th, in conjunction with the National Dental Association, Chicago, Ill.

We are arranging a program which will be of absorbing interest and urge every member who belongs to the N. D. A. to join us in the good things we are preparing.

J. W. BEACH.

THE QUESTION OF CHARGING FOR SERVICE

Regarding the matter of paying for dental service by those who are well able to pay. A dentist is asked to give but one hour a day to the registrants. He would, therefore, be giving but one hour free dental service whether the man could pay or not, and this surely is not a great hardship on anyone. If the Registrant pays for the service, then directly it ceases to be voluntary service on the part of the dentist, and is therefore, not Preparedness League work. There is no objection to a man who is able to pay for the work, going to his own dentist to have the work done and pay for it, but such service should not be recorded as Free Dental Service or as Preparedness League work, as it is work done strictly in a private capacity and is in no way connected with volunteer service. On the other hand, if any Registrant, however well able to pay, is willing to accept free service at the hands of the Preparedness League, it seems very little for the League to take care of him in comparison with the man offering his life for our protection, and I should dislike very much to hear that any dentist would refuse volunteer service under these circumstances.

CONTINUOUS APPOINTMENTS NOT PRACTICABLE

Making appointments with individual members of the drafted men is, I think, not practicable for the reason that it is only through organized channels that the dentists offering their services, can be assigned their fair proportion of the work. If work was continued on each mouth until it was put in good condition, it would work out to the advantage of the few and the disadvantage of many. If a Registrant needs a second or third appointment to make his mouth dentally fit, refer him back to the League's Headquarters for such appointments, and if time permits, there is no doubt but that he will be taken care of, meanwhile, those who come after him are not being neglected.

On the other hand, if a Registrant requires a second or third appointment and the dental operator is interested enough in his case to finish the work, then additional appointments may be made with the Registrant providing they do not interfere with the time he has already pledged the League. In other words, only one hour is to be given each Registrant unless other provision has been made for him either by the dental operator or by the Preparedness League. The *once over* for each Registrant is the important thing to be borne in mind.

BROKEN APPOINTMENTS

When appointments, either first or second, are not kept, the result of course, is loss of time. When this happens it is unfortunate and must be considered a part of our personal sacrifice, as there seems to be no way to guard against it. New appointments should not be given those who break their first appointments, but they should be referred back to the League's Headquarters and sent back to the State Director.

CHAS. F. ASH.

FORM 3-C CARDS

Each dentist should chart the operations performed, sign his name and apply the Stickers furnished by each State Director or County Director. If the operator has no Sticker, cross out the name of the Selective on the address side and write Lieut. W. A. Heckard, D.R.C., 50 East 42nd Street, New York City across the card and mail at once.

FORM 18 CARD

When the work on each Registrant is finished it should be recorded on Form 18 Card and when this Form 18 Card is filled up and duly signed it should be dropped in the box and sent back to the State Director. Each Card takes care of itself and records work done to date.

R. OTTOLENGUI,
Director of Publicity.

Not few nor light are the burdens of life; then
load it not
With heaviness of spirit. A wise traveler
goeth on cheerily,
Thru fair weather or foul; he knoweth that
his journey
Must be sped, so he carrieth his sunshine
with him.—TUPPER.

An Ideal Political and Social State

TEUTONIC IDEALS

In addressing the Reichstag in regard to the Russian dissatisfaction with Germany's treatment of the "no annexation" pledge, quite in the manner of the promise to us after the Sussex incident, the Chancellor said:

> "We can cheerfully await the further course of this incident. We rely upon our strong position, our loyal intentions and our just rights."

Unkultured peoples like the French, British and Americans, to say nothing of the Russians, may have no conception of the meaning of "just rights." In such case, it will be necessary to turn to the fountain head of truth and justice to learn the meaning. Germany, of course, is that fount.

We need not grope long in the dark. One of Germany's leading authorities—Otto Richard von Tannenberg—has laid down the German definition of right in these words:

> "The German people is always right, because it is the German people, and because it numbers 87,000,000."

This definition of right and justice, or "just rights," is so clear and convincing that the lower forms of civilization with which Germany wars should understand it at a glance. However, if any unkultured Russian should be so boorish as to protest against the German modus operandi for disarming Russia and seizing a vast extent of territory, perhaps he may find help in this extract from another German interpreter of the Golden Rule, as made in Germany:

> "It is foolish to talk of the rights of others; it is foolish to speak of a justice that should hinder us from doing to others what we ourselves do not wish to suffer from them."

The meaning of "just rights" now should be clear. Germany is justly entitled to the whole earth, because she wants it. All who oppose her are opposing justice, therefore, they are criminals. Only through the unrestrained use of the German sword, torch and intrigue can "just rights" be established on the earth.

It follows, therefore, as matter of logic, that Germany has a "just right" to lie to the Russian people to disarm them, and then snatch from them all that she can take and hold. Talk to the contrary is foolishness because, when the German people is always right, others not so strong have no rights.—*Wall Street Journal.*

Having been asked to give my idea as to conditions that must prevail before the ideal political and social State can come into being, I first will say that the subject is most opportune, since we now see before us the actual working out of a revolution that cannot fail to leave behind it a very different world than it found in July, 1914, when the greatest apostle of Force since the days of Imperial Rome threw down the gauntlet to civilization, and undertook to subdue and dominate a world then sound asleep and dreaming that an era of Peace to Men of Good Will, about which the Angels supposedly sang some two thousand years ago, already had dawned upon the horizon of political and social life.

As an illustration of the irony of Destiny as it affects things mundane and the great masses of humanity caught in the meshes of illusion, it is interesting to remember that sometime during the first days of July of that momentous year there came to me a small pamphlet issued by the International Socialists of Europe, in which it was pointed out most clearly and forcefully that, because of the work of that body throughout what is now the raging cauldron of hate, War had been made, forever-and-a-day, quite impossible! That never again would the world behold such a thing as war! Think of it! Right on the threshold of the greatest and most brutally-savage conflict known in historic times; after every trap had been baited, set, and made ready to be sprung: after, as now is known, carefully veiled orders to strike at a certain definite moment had been sent out from Teutonic chancelleries; after every sword had been ground, every plan laid, that pamphelt had been printed and internationally circulated. To be sure, it was only a part of the camouflage employed to conceal real intentions and movements; but I am convinced that the poor dupes who wrote it, printed it, paid the postage and circulated it, had no part in the deception; that they themselves were as greatly duped as were any of those who read it and believed in it. At the time when it was in process of production, the declarations of war already had been written and awaited only the signal of the chief butcher to be flung before the eyes of a drowsing world.

Before attempting to paint a picture of what may seem to approximate very nearly the Ideal State, both politically and socially—and they are one and the same, since man and his activities are at the base of all association and man is ONE and not several, although he has, of course, many avenues of action—it may be well to consider some of the elements that entered into the incongruous and heterogeneous mass of mankind called the State, at the beginning of the Great War.

At that time there were many and diverse forms of government—Empires, Kingdoms, Czardoms, Sultanates, Dukedoms, Principalities, Republics and Commonwealths; but while the names and forms were many, those who look into such matter even a little soon will perceive that, underlying all these forms or expressions of authority and control, there were but TWO great, and greatly opposing, Principles or Ideas. One of these principles rests upon the outworn theory of the teleological origin and nature of man, and the other upon the hoarily ancient but only recently revived idea that man is a self-existing, self-evolving, Autonomous Being, a Unit in the Great Principle and Cause of Life and all of its expressions.

Reduced to their lowest terms, these two great, opposing principles may be expressed very simply. One rests upon, is the very embodiment of, the assumption of the Divine Right of Power. The other upon the entirely obvious and self-demonstrating Ideal of the Divine Power of Right.

In our first classification we must group all of those forms of governmental control which do not rest upon nor take into account the consent or free choice of a majority of those governed, but upon the supposed and assumed appointment by Deity of certain men and families as His vicegerents and representatives upon earth, and the delegation to them of His Will and the power to enforce that will upon all not so favored.

Here we have the fundamental basis of Autocracy, Absolutism, Militarism, and all other isms and forms of monarchy, under whatever more or less euphonious name any of them may choose to masquerade.

Any departure from the unlimited, unquestioned, dictatorial power of the ruler was and is, by just that much, a step toward the other and diametrical opposing fundamental principle, Autonomy, or complete self-government by the whole people, such as that existing only in the United States, where, if there were and still are, many things and ideas that seem to interfere with the complete freedom of the Individual citizen, the underlying Principle IS accepted, and it is working itself out and is being worked out as rapidly as the evolution and progress of the individual permit. That is: If we have not, in this country, the best of all possible political and social conditions, if the unlimited freedom of the individual citizen is not yet accepted in practice, it is because, and only because, of elements still undeveloped in the mass making up our people that renders such acceptance in practice impossible, or, at best, undesirable.

One undeveloped element in human character in bulk that would tend to establish and maintain a State resting entirely upon the principle of individual autonomy is the element of Unselfishness, of altruism, of other-thinking, to coin a phrase; of the complete recognition of the rights, privileges, happiness and property of OTHERS; and this lack of development underlies the very general failure to recognize the great fundamental law of Meum and Tuum, of Mine and Thine.

So long as we men and women of America fail or refuse to act upon this great law of ethical right, to recognize and accept it because it *is* right, and not because of law or public opinion or any other restraint, just so long will we be unfit for complete and entire relief from and independence of all and every form of constraint.

Just to illustrate and emphasize the point, let me ask you to ask yourself, honestly and sincerely, how many men and women you know who are willing now to recognize completely the rights of property owned by others; and how many who consider property as rightfully belonging to its possessor only so long as that possessor is able to defend it against the aggressions of others; only so long as you or some other man or woman is unable, by hook or by crook, by superior intelligence if not by force or fraud, to wrest it from him?

Let this question be honest, searching and thorough, not palliated by personal preference or any other consideration, and then see what you will be obliged to answer.

Do we not know that our entire code of so-called Civil Laws—the Law of Contracts, the Law of Deeds and Mortgages, as instances—exists for the sole and only purpose of protecting the simple against the shrewd, the unintelligent against the worldly-wise, the ignorant against the intelligent and unscrupulous, the weak and friendless against the strong and influential? That protection is the one purpose and intent of all such laws; and long before an ideal political or social state can come into being, here or elsewhere, all such laws must cease to be necessary, must die of inanition and disuse, existing, if at all, as mere dead-letters, interesting only to the antiquarian and the archæologist.

As we seem to be a long day's journey from such a consummation, however devoutly it is to be wished for, it would seem also that any progress toward an ideal political and social state depends wholly upon the evolution and education of the individual; and there, indeed, we must look for the initial step in all improvement. There is, of course, no other source from which initiative possibly can spring. The idea of handling men in a forward direction by law and in masses is just as repugnant to the ideal of freedom as is handling them by militarism in the opposite direction. Progress, to be genuine, must be free and untrammelled.

In addition to the two extreme ideals, Absolutism and Complete Personal Autonomy, as they existed in 1914, the first represented by his satanic majesty the kaiser, by the weak and wilful czar, by the emperor Francis Joseph of Austria, and by the sultan of Turkey (may his name be anathema), and the second by France, Switzerland, the United States and some South American countries, there were many other forms resting upon a compromise between the two ideals, illustrated by what is known as the Constitutional or Limited Monarchy, these varying from the very smallest relaxation of arbitrary rule to the almost complete freedom of the peoples of the British Empire, which stands out prominently as a case so extreme that it is a monarchy in name and form only, its citizens enjoying in all parts of the world as great, and in many cases much greater freedom and partnership than do the citizens of some of the republics as they now exist. So far as actual power and influence are concerned, King George stands far below President Wilson.

But the limited monarchy is a compromise and therefore an anomaly that, so far as England is concerned, is far more an inherited habit of thought than any deeply-seated conviction. Should the present reigning house fail of an heir to the present wearer of the crown, it is doubtful if Parliament would choose a successor; but, in any case, Parliament would *choose*—that's the point.

The "Old Order Changeth;" are we ready for the New? If not, what must be done in order to prepare for it? The dawning of the ideal State depends, as it seems to me, upon a third factor not included in my title, although necessarily implied thereby; and that factor is the birth and development of what has been called the Ethical Sense. Let us consider some of the changes, some of the modifications in our common consciousness, that must come about before we dare hold a reasonable hope for complete individual and personal freedom.

The man or men who wrote our Declaration of Independence and the Constitution of the United States, had vision and courage, and were developed in every way far beyond the average citizen of the great country founded by them, even at this time, nearly a century and a half later. Which is only a polite way of saying, as Shakespeare has it: "One cannot make a silk purse out of a sow's ear."

These men wrote into the organic, fundamental Law of America, "Equality of Opportunity." The people of the present United States of America, as a mass, construe that to mean: "Every fellow for himself and the devil take the hindmost."

They wrote into those great documents: "The Greatest Good to the Greatest Number." Those who now occupy the social, political, and particularly the financial stage construe that to mean: "Let him get who can; let him keep who has the power." "Caveat emptor!" Let the buyer beware! "Cave canem!" Look out for the dog! These would seem still to be appropriate mottoes for. many of the "most prominent citizens" of the country of Thomas Jefferson, Thomas Paine, George Washington and Paul Revere.

These ideals of competition, of greed and grab, must pass away and be succeeded by vastly different ones in the minds of the powerful of earth, before a government of, by and for the people can become a reality rather than merely a dream of the Revered Lincoln, who lost his life rather than lend his name and the authority of his great office to the oppression and spoilation of a conquered people.

Into the consciousness of the people as a whole, into the mass-consciousness of mankind, must be filtered ideas something like these:

Your liberty ends where the rights of others begin.

Might intellectually, financially or socially, does not any more make right ethically, than power makes right politically or physically.

The right of others to Life, Liberty and the Pursuit of Happiness must not alone be respected; it must be *guarded and guaranteed*, by you and by all, against abuse by their neighbors as well as against encroachments from foreign foes.

We have no right to take for ourselves the property of others by stealth, chicanery, process of law or superior intelligence; and if we do it, we are meaner thieves than the burglar or the highwayman. They give their victims a chance and take chances themselves; we do neither.

If you have in your possession something that belongs to another and you know it, you must surrender it at any cost, no matter how you obtained it, or how valuable it may be to you.

Not only "The greatest good to the greatest Number," but ALL possible good to EVERYBODY.

You have the most perfect right to everything that belongs to you, and you also have a duty that justifies and balances that right. You must be entirely willing to do all that you can to help everybody else get everything that belongs to him, even though that may mean giving up something that you can obtain for yourself just as easily as for him.

And greater than all, more necessary than all else, the foundation upon which it all rests, you must realize that you are personally, individually and forever responsible for every violation of the Code of Ethics, of the Great Law of Mine and Thine; and that from this responsibility there is no possible escape, no reprieve. Repentance opens no gateway; there is no forgiveness; restoration, reparation—these, and only these, can pay debts.

And there is another thing: Before the Ideal Political and Social State can come into being among men, all ideas of superiority, of caste or class distinctions as binding divisions, the result of birth, social connection, political position or money, must be tossed into the ash can where they belong. That these conditions always shall and always must exist as natural distinguishing marks among men goes without saying. Men are born naturally and necessarily into four great divisions; but between these divisions those in any one of them must erect no barriers against those in any other of them. The occupants of any particular one of these divisions must cease finally and entirely to regard themselves as of special clay, or expect to gain any particular regard or privilege by reason of that position. Individual merit alone is of any value, and upon that alone must rest all progress and all preferment. We must come to agree perfectly with Bobby Burns that "Rank is but the minter's stamp; the Man's the gold for all that," under, behind and beneath all title and position. A gold dollar is just as honorable, its gold is just as pure, as that of the double-eagle—and no more so. Within its limits of value in performance, it stands just as high, is worth just as much per grain, amd no more.

Advantages of position must be balanced by responsibilities, by worthy effort for advancement. From him that hath much, more is expected than from him that hath little. An idle million costs its owner a million times as much as an idle dollar.

Probably the first step toward an ethical conception that shall make the establishment of the Ideal Political and Social State possible is the enforced recognition by all mankind that the Right of the Individual is the Only Might. That is precisely the lesson that the great war is intended to teach. That Might is the only Right is the motto and the battle-cry of barbarism and special privilege and the savagery that springs from the harboring of such notions. Those of us who are able to see even a little below the surface of things know well that the prolongation of the war was necessary in order that the lesson might be forced home upon the consciousness of all mankind as only blood and tears can enforce it. While the lesson was most sorely needed by the Teutonic peoples, whose arrogant assumption of Superiority and Divine Right brought about the conflict, the Allies who oppose them, even France who stopped them at the Marne with almost her naked breast, were not at all certain, at the beginning, what the war was about; and now it is even [illegible] if all of us, in this country where [illegible]ligence and comprehension are [illegible] quite certain about it.

The world must learn that it is the duty of the strong to help the weak, that strength exists for that sole purpose, whether among nations or among individuals; and that superior power never has the privilege to batten upon those unable to protect themselves.

"The strong shall help the weak, and the weak shall make gentle the strong." So wrote, upon tablets of stone that shall endure while the world lasts, one of the world's greatest strongest and most powerful teachers and helpers; and strife never can end until this mutual helpfulness shall become the single binding motive of mankind.

Reduced to the Principle of Ethics upon which the Ideal Political and Social State of the future must rest, this teaching takes shape in my mind about like this:

Unimpeded individual evolution, aided by voluntary co-operative and reciprocal service, rendered for the *sake of the service*, and for dear love of all mankind. —G.E.H.

Buy War Savings Stamps and Thrift Stamps and save this country not only from the vice of extravagance but save for it the greatest heritage of all times—that priceless treasure of liberty and democracy.

REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XXXVIII July, 1918 No. 7

FRACTURES AND DISLOCATIONS OF THE JAWS*

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REDUCTION OF FRACTURE AND THE RETENTION OF THE FRAGMENTS

TO REDUCE a fracture of the jaws the fragments should be grasped between the thumb and fingers of either hand and by gentle manipulation carry them into normal position. In cases where teeth are present, the normal position is ascertained by observing the natural occlusion of the teeth. When the fracture occurs in an edentulous jaw, the [illegible] be guided by the general contour of the parts and by [illegible] the surfaces.

If the reduction is not made until some time after the injury, it may require considerable time and patience to bring the fragments into normal relation. In these cases the reduction is complicated by the cicatrix of the soft tissues.

When the reduction is made soon after the injury, the parts should be carried into normal position gently so as not to injure the soft parts, such as nerves and vessels. Again, the handling of the parts roughly may carry infection into the deeper structures.

After successful reduction of the fracture is made, the next question which confronts the operator is how shall the fragments be retained in their normal position? This is a question which should not be passed upon without a thorough consideration of all of the factors involved, such as muscle strain, amount and character of displacement, direction of line of fracture, and the time which has elapsed between the injury and the time of operation.

We will take up first the use and abuse of bandages as a means of retention in fractures of the jaws.

Hippocrates, more than a score of centuries ago, recognized the absolute inefficiency of bandages alone in the retention of the fragments in fractures of the jaws; yet with all of the teaching that has succeeded that of the famous Greek physician, this method is still practiced by some men with its consequent deplorable results.

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A bandage *per se* should only be considered as a means of first aid, and should be used only until proper splints can be constructed or used in conjunction with a splint as a means of further support.

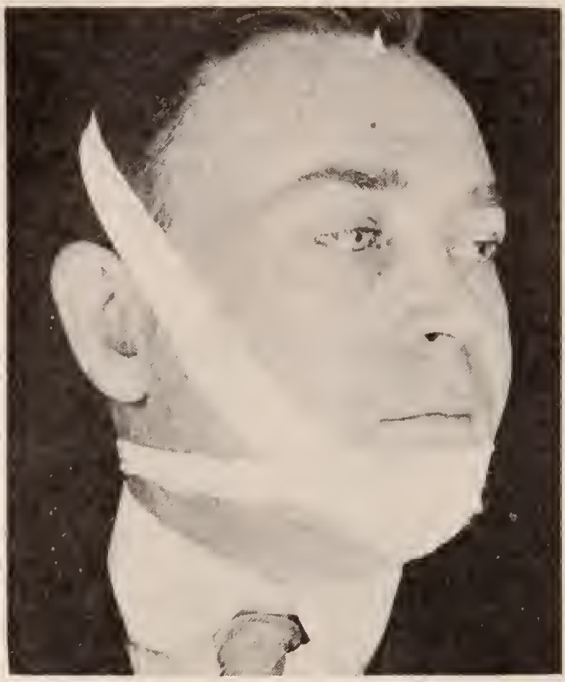

Fig 31

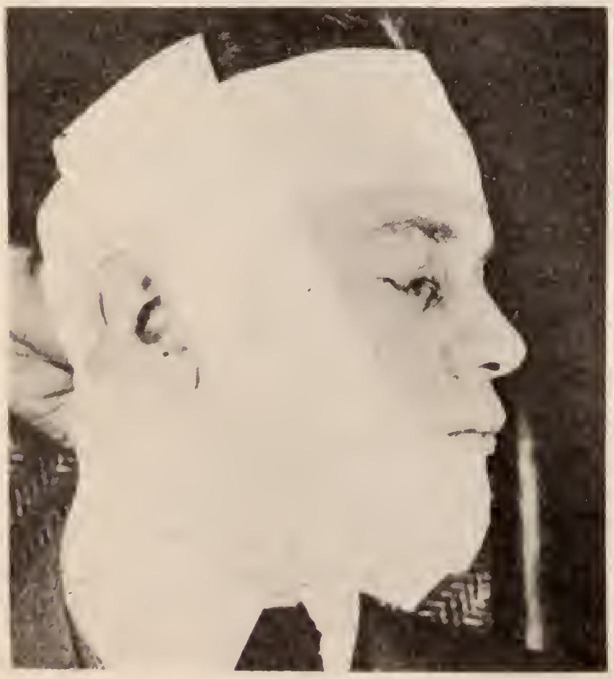

Fig. 32

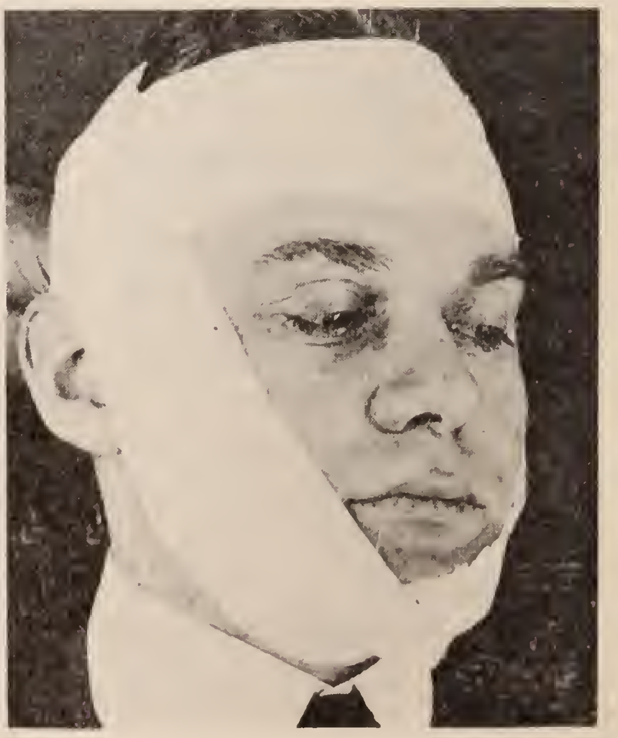

Fig. 33

The most simple bandage and the one that can be applied with the greatest ease, is the so-called four-tailed bandage. (*Fig. 31.*) This is made by taking a strip of bandaging material (heavy muslin or linen) three inches wide and long enough to encircle the head. It is then split from each end, leaving about four inches in the middle of the bandage intact. The central portion is then placed over the chin, the upper tails tied behind the occiput and the lower tails tied over the top of the head. These can be supported further by tying the upper tails to the lower at the back of the head. This makes a firm temporary bandage and can be quickly applied.

A modified Barton or figure-of-eight bandage (*Fig. 32*) is more satisfactory than the four-tailed bandage if it is to be left on for some time. This is adjusted by taking a two-inch roll of bandaging material and winding it around the chin and over the top of the head for several turns. This should be applied very tight and firm. Then it is turned on itself and wound behind the occiput and around the forehead for several turns. It is then brought below the ears and around the chin for several turns and pinned. This sets the lower jaw firmly against the upper teeth and also prevents the external pterygoid muscles from forcing the fragments forward. A crossed or oblique bandage (*Fig. 33*) is also a satisfactory bandage when there is little displacement of the fragments and it is advisable to retain normal occlusion until adequate splints can be constructed. The bandaging material is wound around the anterior-posterior of the mandible and top of the head and turned on itself and wound around the forehead and behind the occiput.

The strength and efficiency of bandages can be greatly enhanced by supplementing a bandage in which has been incorporated plaster of Paris. This should be applied over the first bandage and allowed to set, thus forming a plaster of Paris cast. After the bandage has set, and before dismissing the patient, it should be sawed in two in the temporal region so as to provide for ready release of the jaws in case of emesis. The parts of the plaster of Paris bandage that have been cut may be readily united with zinc oxid adhesive tape. This double bandage, in the opinion of the writer, is the only one that should be considered effective in retaining the teeth in natural occlusion. This bandage cannot be used successfully when there is considerable swelling and contusion of the soft tissues.

INTERDENTAL LIGATION.

The methods of interdental ligation for the fixation of fragments in fractures of the jaws is one of the oldest methods in use. Hippocrates used this method 2500 years ago. This method consists of fixing the lower jaw to the upper by means of wire or silk ligatures. The author has found that copper bronze wire, gauge 24, is most suitable for this purpose. One of the simplest methods of interdental ligation is by passing the wire ligature around several individual teeth in the upper jaw and around the same number in the lower jaw. These ligatures are twisted on themselves (*Fig. 34*), and afterwards the twisted wires from the upper teeth are criss-crossed to those on the lower teeth and twisted together (*Fig. 35*). As an illustration, the wires from the upper first molar are passed forward and down to the lower first bicuspid; the wires from the upper second molar to the lower second bicuspid; the wires from the lower first molar to the upper first

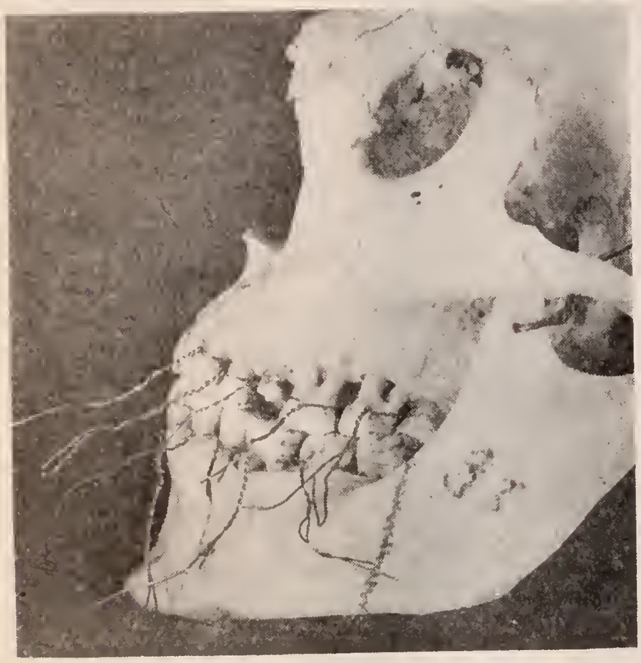
Fig. 34

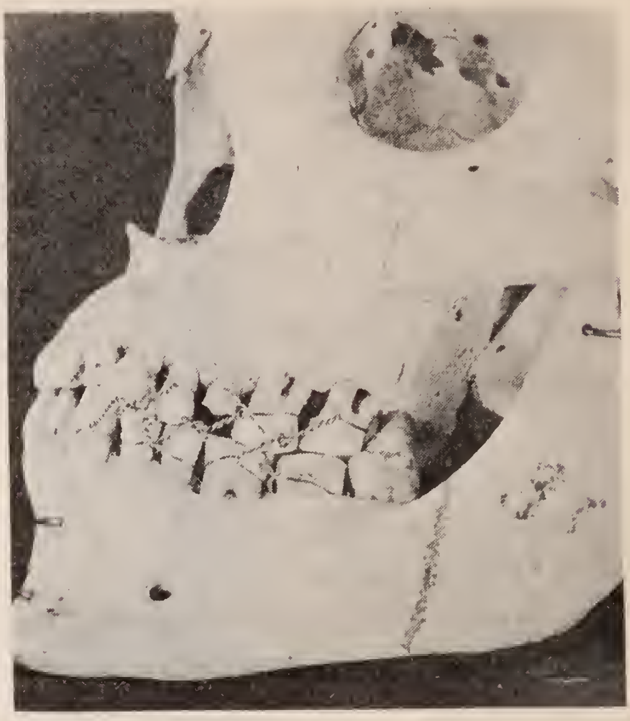
Fig. 35

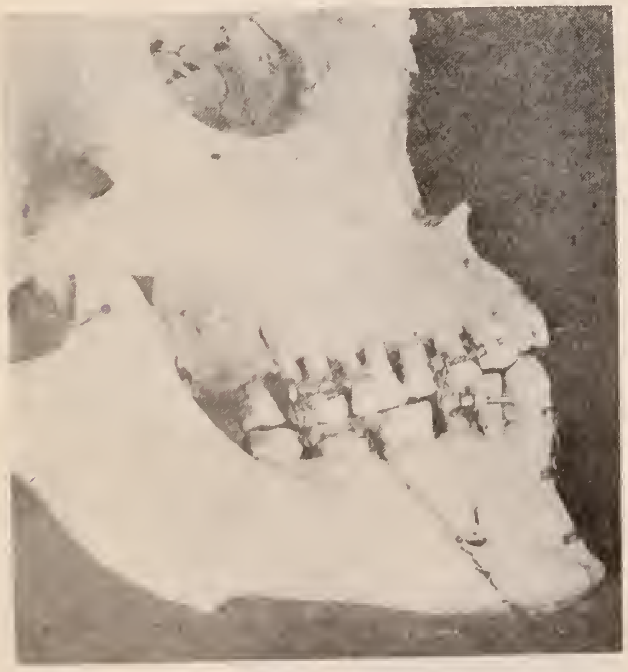
Fig. 36

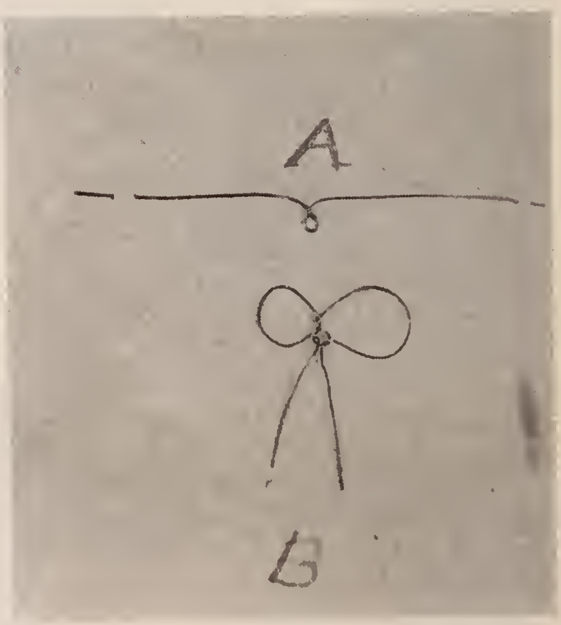

Fig. 37

bicuspid; the wires from the lower second molar to the upper second bicuspid, etc. This wiring should be done on both sides of the jaws. The greater the number of wires, the stronger will be the fixation. The criss-crossing of the wires prevents any anterior-posterior movement of the fragments. Sufficient wires must be placed on both sides so that if one wire breaks during the process of repair, there will be a sufficient number of wires left to retain the parts, as new wires cannot be placed after the jaws are wired in occlusion.

Another method of interdental ligation is by the use of the Angle fracture bands. These bands are made similar to the Angle orthodontic bands, with the addition of a lug on the buccal surface of the band for the purpose of attaching interdental wires. Several of these bands can be placed on the opposing teeth of the upper and lower jaws and the ligation made from these lugs (*Fig. 36*). The ligatures can be criss-crossed, which will make the fixation firmer. Copper-bronze orthodontic wire is used in conjunction with these bands.

Captain Robert T. Oliver, of the United States Army, has suggested a very clever method for interdental ligation. This was published in a paper on "Fractures of the Jaws," by Dr. Don S. Graham, *Items of Interest,* March, 1912. This consists in forming a loop (*Fig. 37A*), with each individual ligature and passing the ligature around the teeth in groups of two, both above and below, leaving the loop on the buccal surface in the inter-proximal space (*Fig. 38*). Secondary wires are then passed from the loop above to the loop below and the fixation made in this manner. This has the advantage of enabling the

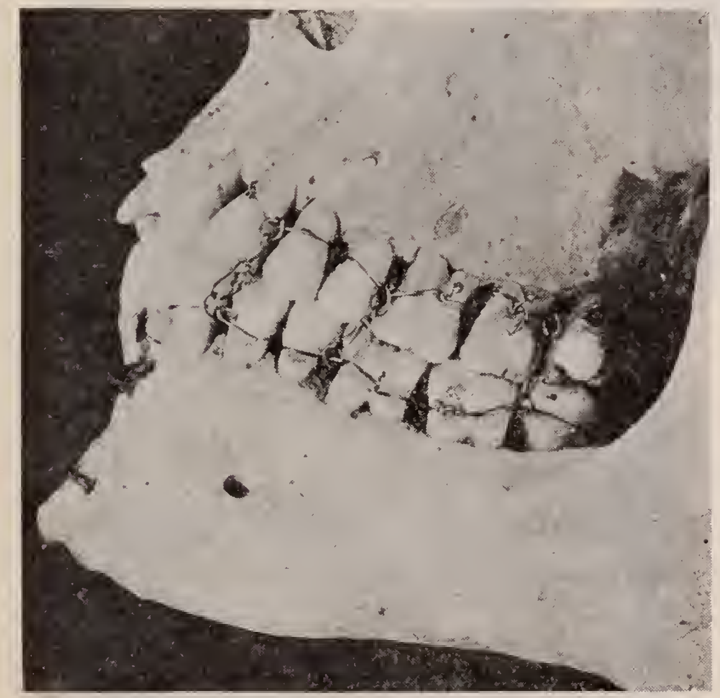

Fig. 38

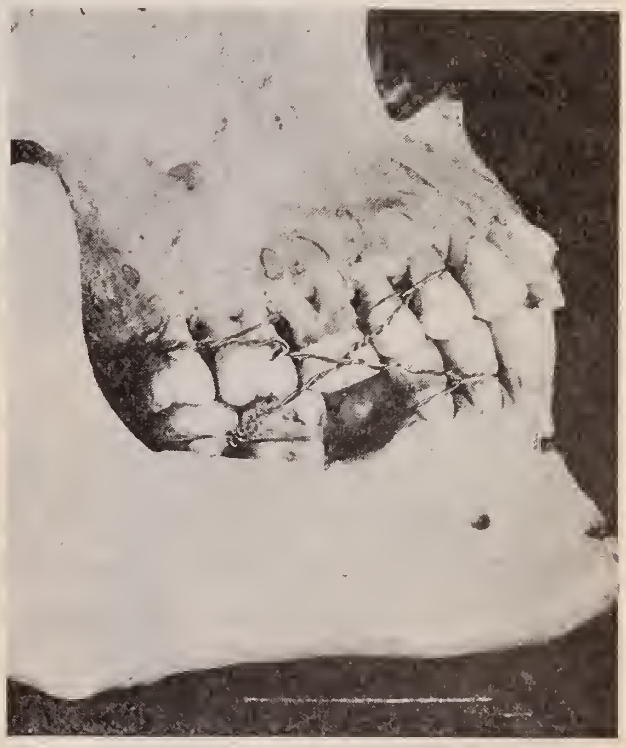

Fig. 39

operator to cut the secondary wires if emergency should arise that the jaw should be opened before the process of repair is complete, and again replacing the jaws in the fixed position and rewiring them.

A modification of this method has been called to the writer's attention by Major Joseph Eby and Dr. S. L. Silverman, of Atlanta, in which the ends of the wires are passed through the loop before twisting together (*Fig. 37B*). This forms a perfect slip-knot on the teeth and makes a firm fixation. (*Fig. 39.*)

Dr. T. L. Gilmer, of Chicago, has devised another method of interdental ligation which has proven very satisfactory (*Fig. 40*). This method consists of ligating a wire arch, gauge 16, to the upper and lower teeth. These arches are then used to attach secondary wires for the fixing of the lower to the upper jaw. Four or five secondary wires, gauge 24, are attached between the jaws to the wire arches. This method has also the advantage of enabling the operator to get into the mouth in case of emergency and again replacing the secondary wires without any disturbance to the case.

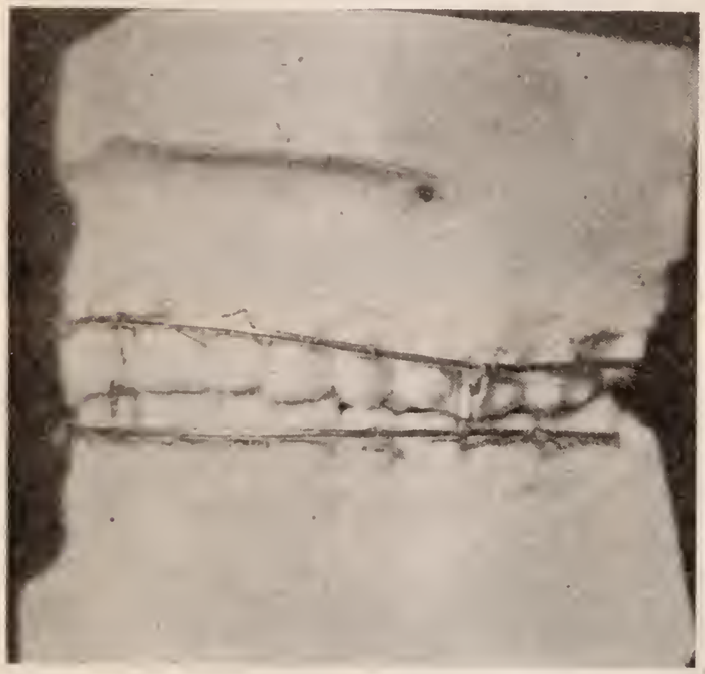

Fig. 40

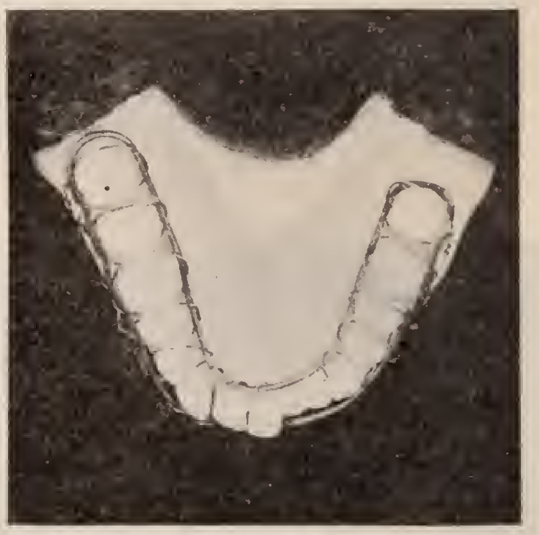

Fig. 41

Fig. 41 is a satisfactory method of wiring the jaws where there is a single fracture of the mandible. This consists of a wire arch, gauge 16, on both the labial and lingual surfaces of the teeth. This arch is then wired to each individual tooth around the jaw. If, for any reason, interdental ligation is indicated, secondary wires may be attached from the arch to the upper teeth.

Fig. 42 shows a method of wiring the jaws together for fracture at the symphysis. Pure silver wire, gauge 18 or 20, is placed through the mandible on either side of the line of fracture. The silver wire is placed in position by first drilling holes through the mandible with a bone drill. The ordinary dental bur is contraindicated for this work as the head of the bur soon becomes clogged up with bone dust and will break off. These holes should be drilled through the mandible about one centimeter on either side of the line of fracture, two holes on either side about five millimeters apart. These holes

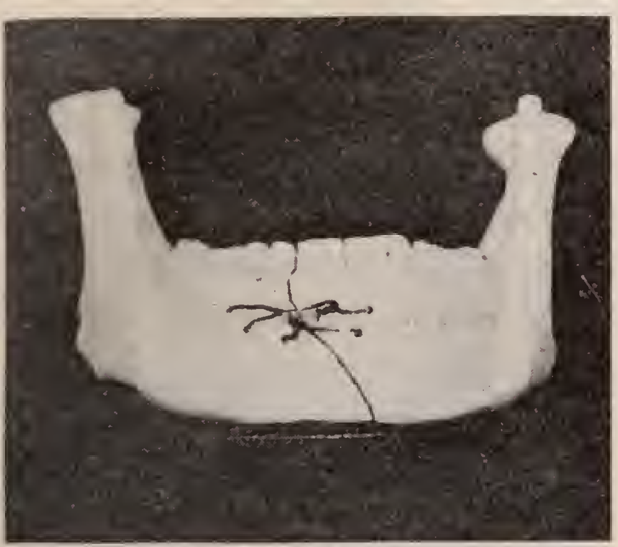
Fig. 42

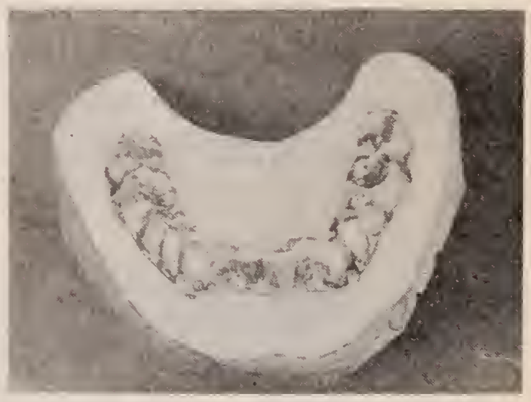
Fig. 43

should be drilled so as not to disturb the roots of the teeth. Silver wire is then passed through the upper hole from the labial surface to the lingual and back through the lower hole on the opposite side of

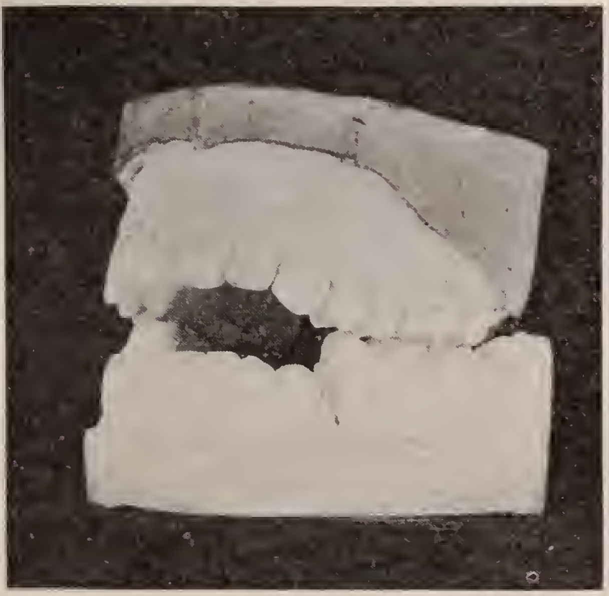
Fig. 44

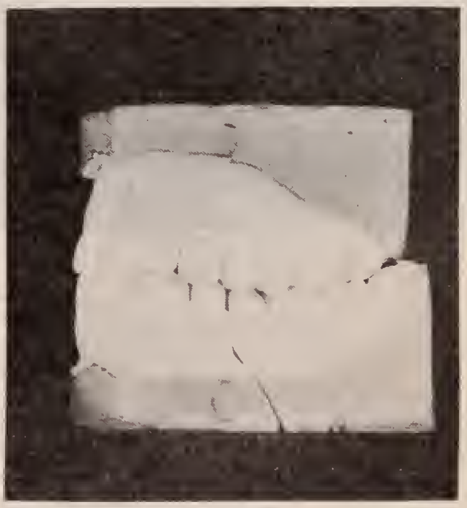
Fig. 45

line of fracture from lingual to labial. The other wire should be passed through the two remaining holes. This forms a criss-cross of the wires and prevents movement of the fragments. This wire is left in position for from thirty to forty days. In simple fracture of the symphysis, no other treatment need be resorted to.

Fig. 43 shows a splint for retaining the fragments in multiple fractures of the mandible anterior to the angle of the jaw. An impression is taken of both upper and lower jaw of soft modeling compound. Models are then made from the impressions. (*Fig. 44.*) The model of the lower jaw is divided at the line of fracture and re-assembled and articulated with the model of the upper jaw. (*Fig. 45.*) Correct articulation of the teeth presupposes that the fragments are in correct apposition. A splint can either be cast in silver or swaged out of German silver. If the splint is cast, tinfoil should first be pressed over the model before using the casting wax so that when the splint is cast, it will loosely fit the teeth. In the swaged splint, German silver, gauge 32, is used. It is permissible to swage this splint roughly, as it is better that it fits over the teeth loosely. This splint is reinforced by soldering a German silver wire, gauge 18, around the lower margin of the splint. Small holes should be cut in the occlusal surface for the purpose of letting out the surplus cement when setting to place. The teeth should then be dried with alcohol and the splint filled with thinly-mixed cement. The parts are then forced into position and the teeth into the splint. This should be held until the cement is thoroughly hardened. The writer has found that this can be strengthened further by having orthodontic wires already in the inter-proximal spaces before setting the splint. These wires then can be thrown around the teeth and over the top of the splint and twisted together for the purpose of binding the splint to the teeth.

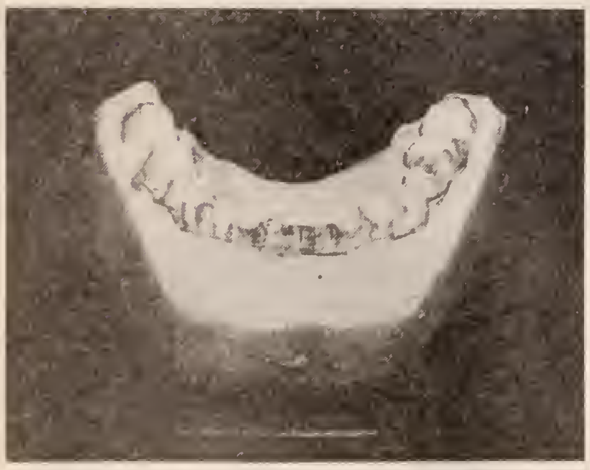

Fig. 46

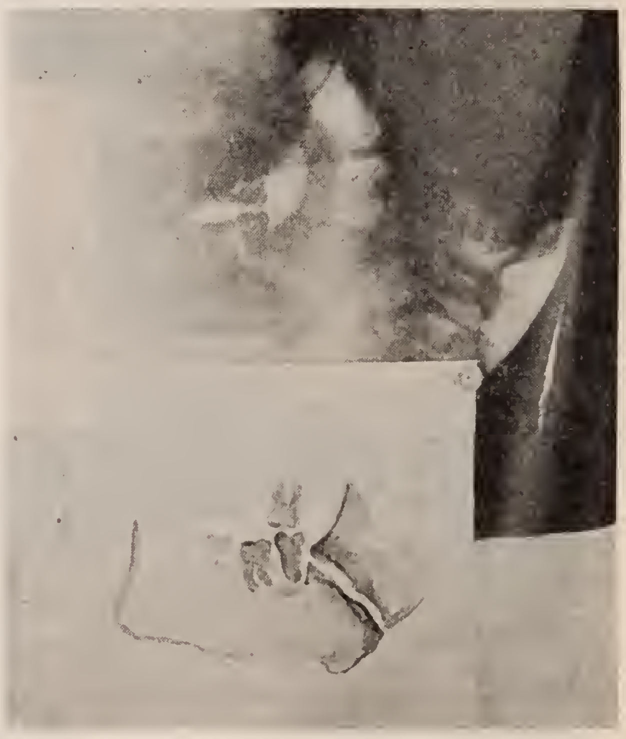

Fig. 47

The swaging can be done either by a shot or a parffin swager or by making a die and counter-die of the model. A vulcanite splint can be made instead of a metal splint, if desired. This vulcanite splint should fit the teeth loosely and a thickness of tinfoil between the splint and the teeth should be observed. This can be accomplished by covering the model with heavy tinfoil before vulcanizing. The vulcanite splint should be just as thin as it is possible to procure it. It can be strengthened by running a German silver wire in the wax model before vulcanizing.

A metal splint is more desirable than vulcanite in practically every case on account of cleanliness.

In case we want to use interdental ligation in conjunction with the splint, the occluding surfaces of the splint should be cut out so that the lower teeth come in direct contact with the upper teeth when the mouth is closed. (*Fig. 46.*) This splint, plus the interdental ligation, is indicated in multiple fracture of the lower jaw when one fracture is distal to the last molar tooth. (*Fig. 47.*) With these splints the bandage as an additional support is permissible and frequently indicated.

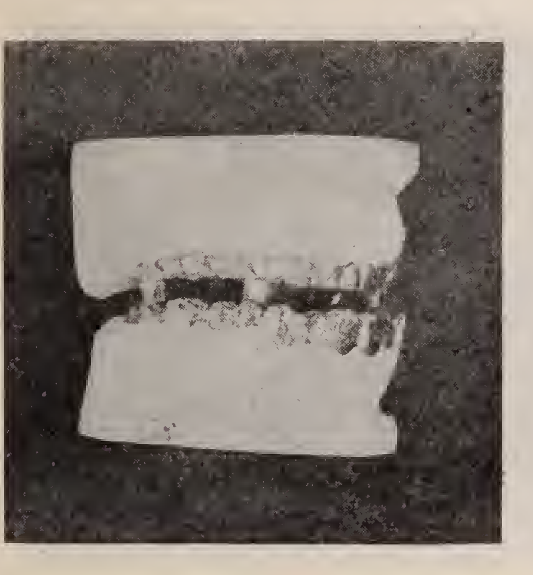

Fig. 48

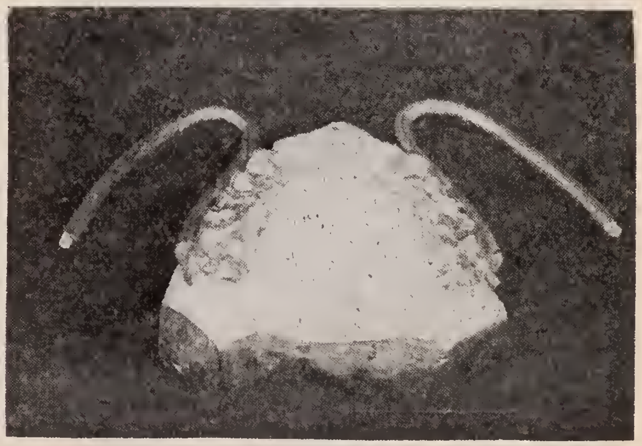

Fig. 49

In multiple fracture of both upper and lower jaw, the same method of making the splint can be used for both jaws. The models should be so cut and articulated that we have models showing the normal relation of the teeth. These splints are then made over the articulated models and may be soldered together so that when set to place the teeth will be in normal occlusion. Metal splints of this kind are preferable to the vulcanite splint for the same reason as given before,—that they are cleaner.

The Gunning splint (*Fig. 48*) is made in about the same way with the exception of lugs being soldered between the upper and lower splints for the purpose of feeding the patient and irrigating the mouth. This also may be made of vulcanite. This splint should not be used in multiple fractures where one of the lines of fracture is distal to the last molar tooth, for the reason that the jaws are held partly open. A V-shaped space would be made in the line of fracture, and if faulty union did not occur, faulty occlusion of the teeth would be the result after the process of repair was completed.

Fig. 49, Kingsley splint, may be used for fractures of either the upper or lower jaws. The splint is made the same as that described in *Fig. 47,* with the addition of heavy extension wires soldered to the buccal surfaces of the splint. These wires should be gauge 8 or 10 and should be so bent that the ends of them extend to the outside of the mouth, along the contour of the face. This splint is placed in position and held firmly by a bandage running from one of the wire extensions around over the head to the one on the opposite side. This splint is indicated where there is a complete fracture of the upper jaw and the parts suspended only by the soft tissues. This is applicable to the lower jaw and the bandage should go round under the chin, which will firmly hold the splint against the teeth. *Fig. 50* shows splint applied to the upper jaw.

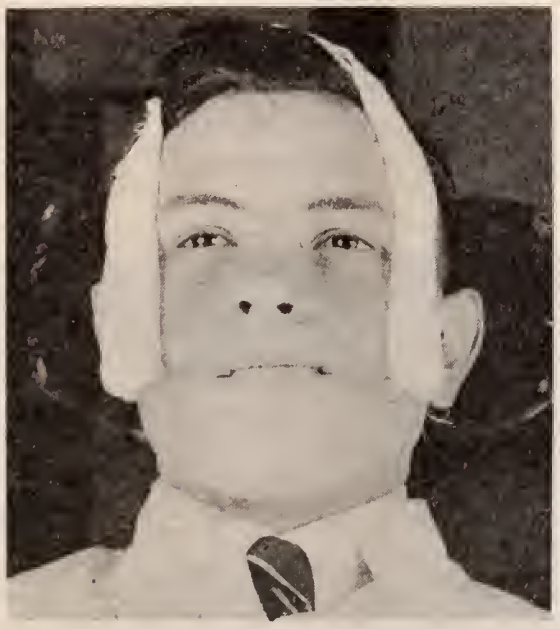

Fig. 50

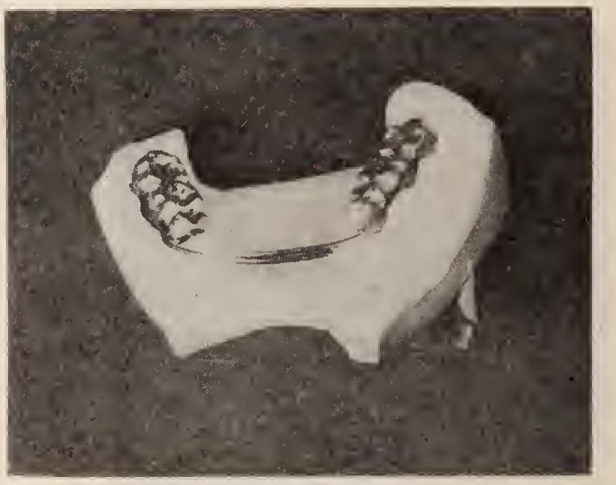

Fig. 51

Fig. 51 shows a splint for the caring for fractures where the symphasis has been lost or shot away. The two lateral halves in such a fracture would be lying very loosely, only supported by the temporo-maxillary articulation. An impression is taken of each half of the lower jaw, models are made and a metal splint swaged or cast to the model. To each side of the splint is soldered a wire extension conforming to the shape of the lower jaw. The splints should then be fitted over each lateral half and the wires paralleled. The two halves of the splint should then be cemented to the teeth. The fracture should then be reduced and normal occlusion obtained. The two parallel wires from either side should then be soldered with soft solder in the mouth. In case it is not possible to solder these wires together, they can be wrapped with copper bronze wire, gauge 28, and the splint completed in that manner. This maintains the normal space of the mandible which has been lost, so that a bone graft may be resorted to later on. This splint should be worn until consolidation takes place, which may be three or four months.

Fig. 52 represents a splint similar to the one just described which may be used in conjunction with interdental ligation in cases where a portion of the substance of the bone is lost, and also a fracture at the angle of the jaw. In this splint wires, gauge 18, may be soldered to each half of the splint by soft solder after it is set, for the purpose of maintaining the space. Small rings may be soldered to the buccal surfaces of the splint for the purpose of performing interdental ligation.

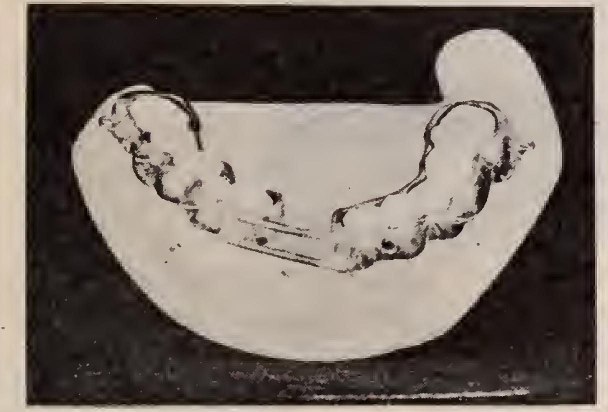

Fig. 52

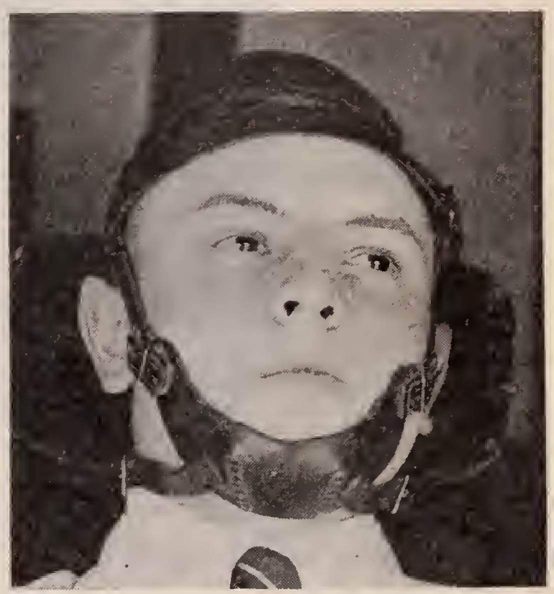

Fig. 53

Fig. 53 is a leather harness which the author has used with considerable success in holding the lower jaw firmly against the upper. This consists of a chin-piece to which is attached straps with buckles which go over the top of the head and also a set which surround the neck. Smooth absorbent cotton should be placed in the chin-piece to make it more comfortable for the patient.

This is indicated in complete fracture of the superior maxillæ when it is desirable to use the lower jaw as a splint for holding the superior maxillæ in position. Interdental ligation should be used in conjunction with the leather harness.

(*To be continued.*)

CAST LINGUAL SPLINT FOR FRACTURED JAW*

BY DR. H. R. ISENHOWER, BLOOMFIELD, INDIANA.

THE CONSTRUCTION of the cast lingual splint is as follows: Take the impression of both jaws and articulate the models as in making an inter-dental splint, with one difference: Make the model of the fractured jaw one-half pumice stone, one-half plaster of Paris. After the models have been articulated, remove the model of the fractured jaw from the articulator and trim well. Take a sheet of pink base-plate wax and fold a one-quarter-inch strip the full length of the sheet. Now heat the sheet of wax and press to place on the lingual side of the model of the fractured jaw and trim level with the occlusal surfaces of the teeth. Take a roll of wax and make a "Y" shape and attach to each side of the wax on the

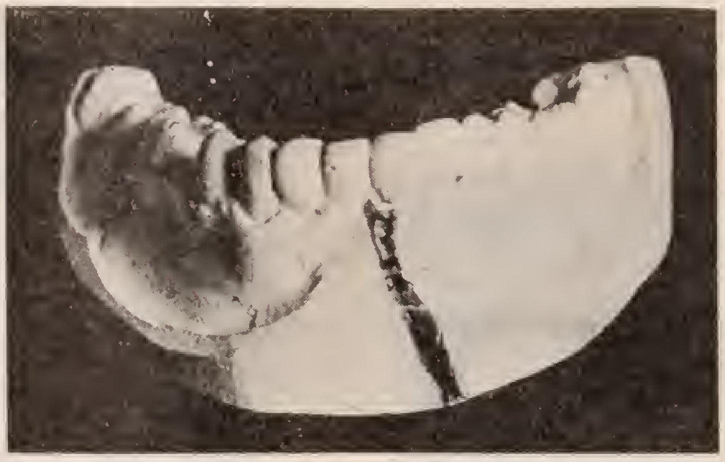

Fig. 1

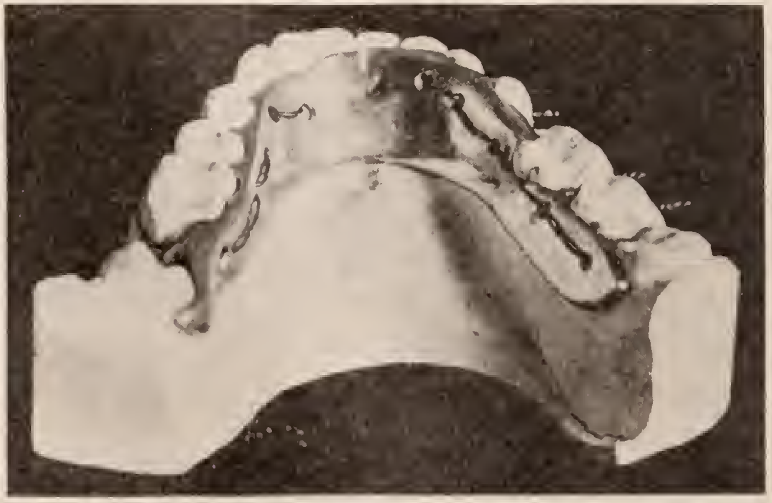

Fig. 2

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*Read Before the Greene County Dental Society.

lingual side of the model for the place to pour the metal. Attach a small roll of wax to the heel of each side of the wax on the model for gates.

Fig. 1 shows the case waxed and ready for investment.

Invest in an ordinary flask, omitting the cover and letting the "Y" shape and wax gates extend out of the investment.

The investment, one-half pumice stone, one-half plaster of Paris. After the investment has set, place the flask over a slow heat and burn out all the wax as in making an inlay. After the wax has burned out increase the heat and drive out all moisture. After the moisture has all been driven out and while the flask is hot, melt in a ladle Weston's New Metal and pour the metal into the opening that was made with the "Y" shape wax. Pour until the metal can be seen at the gate openings. When cold, remove the cast from the investment, trim and polish. Drill small holes at all of the inter-approximate spaces.

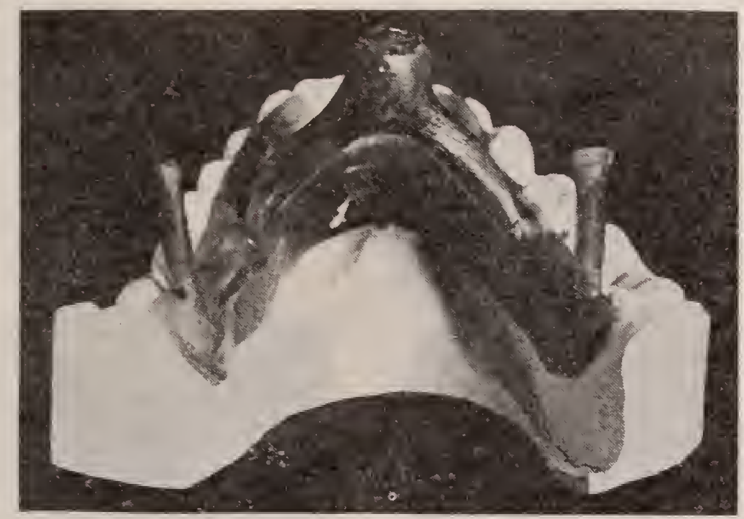

Fig. 3

Now the splint is ready to be placed in the mouth, and if each step in the construction has been carried out properly the splint will go to place and will restore the jaw to its original shape.

After the splint is in the proper place in the mouth, pass wire ligatures between the teeth, through the holes in the splint and twist them tight on the labial side of the teeth.

Fig. 1 shows the line of fracture.

Fig. 2 shows the splint in place.

There are several advantages of the cast lingual splint:

First: The simple ease and time saved in the construction.

Second: Good view in placing it in the mouth.

Third: Comfort and ease to the patient.

A FEW REMARKS ON THE POSSIBLE SYSTEMIC AUTO-INTOXICATION PRODUCED BY PERIAPICAL NEGLECT FROM THE NON-SURGICAL REMOVAL OF INFECTED TEETH

BY DR. MILLEL H. FELDMAN, NEW YORK CITY.
CHIEF OF THE DENTAL DEPARTMENT OF LINCOLN HOSPITAL

A GREAT DEAL has been said in recent years about the dangers resulting from hidden or palpable foci of infection arising within and about the pulpless teeth in the human mouth. Much of this warning and outcry has been, and, for that matter, still continues to be, exaggerated to the point of absurdity. It is unwise to attribute almost every unexplainable ailment to the diseased teeth present in a particularly-affected individual; unwise, I say, because the medical practitioner is apt to be put on the wrong trail and desert other leads which might point to the solution of the disease. On the other hand it is the purpose of the writer to emphasize the possible antagonistic attitude of the bacterial flora of the mouth toward the healthy human cell proximating, or relatively distant, from the localized infected area in the mouth.

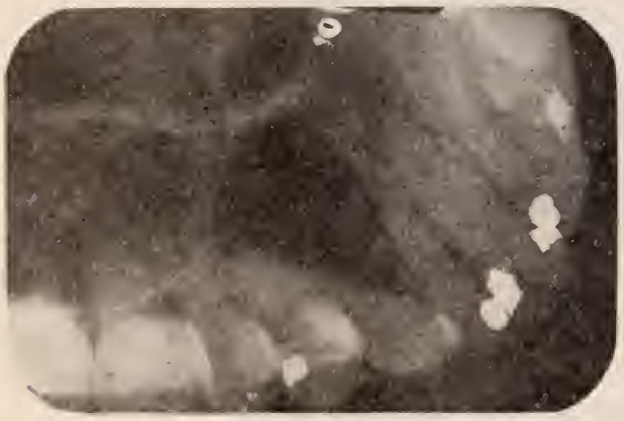

Fig. 1

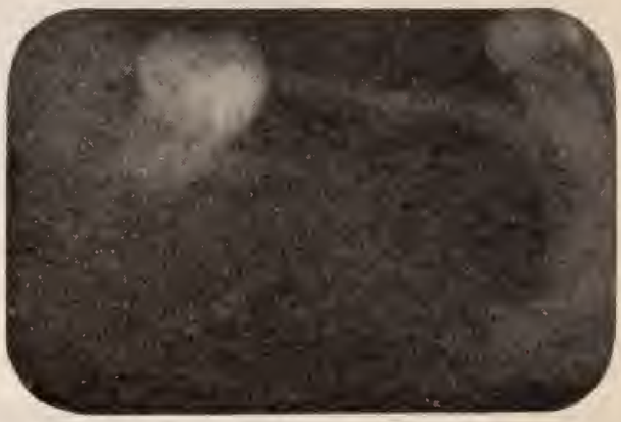

Fig. 2

The writer has had infinite opportunity, both in his hospital and private practice, to note the intimate relationship existing between arthritic involvement and dental infections. Many of the dental infections were not even giving the patient the slightest local disturbing symptoms; the existence of the diseased areas being discovered only by the use of the Roentgen-ray. The clinical observations of the writer, thus recorded, have convinced him of at least this: That the mouths of all patients coming under the care of physicians should be subjected to a complete Roentgenographic examination and the conditions revealed be made a factor in the diagnosis and general treatment of the systemic ailment.

It is the common practice among many to extract diseased roots and leave the wound and socket to Nature to take care of. In the writer's experience this practice is not only non-surgical but really of harmful result. When the pulp of a tooth root becomes diseased, and is not treated properly, the bacterial toxins pass upward into the periapical space and cause dissolution of those sub-dental tissues. The radiograph discloses in such cases marked radiopacity, representing cystic degeneration and carious destruction of the alveolar tissues. Obviously the removal of the diseased root or roots cannot remove this tissue. The apical granuloma and the sub-apical alveolar structure must be removed by surgical curettment and the socket packed for some time in a series of post-operative visits. By this means alone can the oral surgeon hope to remove whatever vestige of infected tissue may be remaining to pour their insidious toxins into the blood stream and into the lymphatics to attack the weakened and non-resisting tissues elsewhere in the economy, be they lymph nodes or glands, intestinal lining, or myocardium.

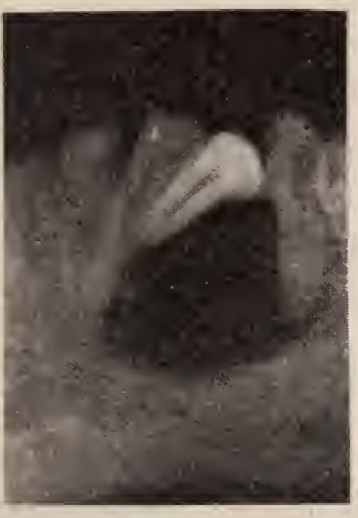

Fig. 3

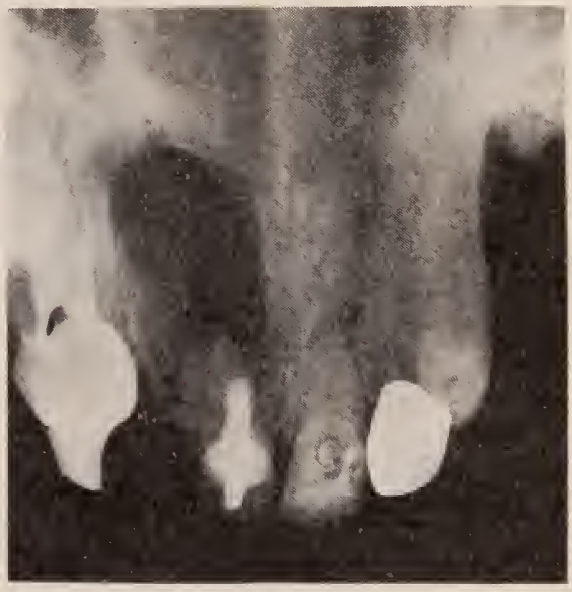

Fig. 4

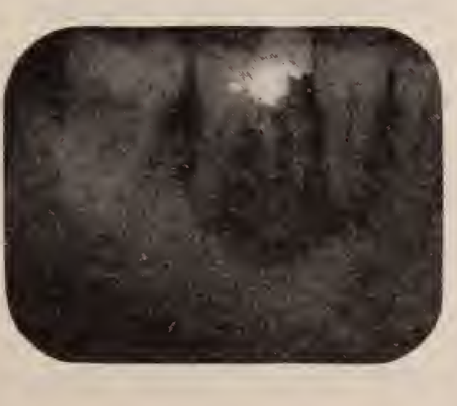

Fig. 5

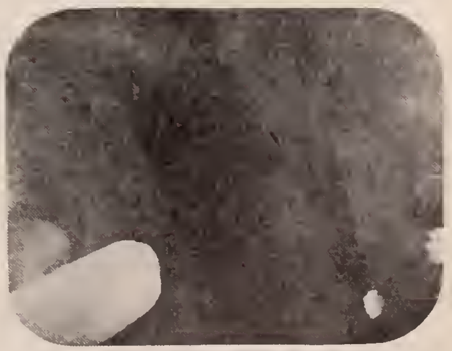

Fig. 6

To present a long list of cases from practice descriptive of just these conditions of arthritic involvement from the lymphatic absorption of toxins draining into the vascular system from deep-seated carious osseous tissue, would be but a trite repetition of similar recitals appearing in the literature of the day. It will be sufficient for the purposes of this paper to present a number of most interesting Roentgenographs from the laboratory of Dr. S. Leeshutz, whose work along this line is really remarkable.

In conclusion the writer wishes again to emphasize the necessity of elimination of oral infections and making healthy the entrance of the alimentary canal before any systemic treatment of general constitutional disturbances is undertaken.

616 Madison Avenue.

DENTAL OPERATIONS, MATERIAL AND FEES*

BY G. E. HARTER, TOLEDO, OHIO

> "Try your hardest, give all you can, act by the inner light and stand true to what you know, and let the result take care of itself. You will be surprised to find that it was not nearly so bad as you think; perhaps it was more than passably good; possibly it was excellent. If you are too anxious about the impression you are less likely to succeed than if you are passionately engrossed in what you do. All is forgiven to sincerity."

AS I SIT in your conventions and take some small part in them, and every day at my work, all of which has to do with you and your practice, I am continuously and increasingly impressed with the serious and earnest responsibility that rests upon every member of your profession. Therefore, you may well understand that it is in no light mood that I come before you today.

At your meeting last year I listened to papers and discussions that impressed upon me the idea that while some of you regard your work as that befitting true servants of humanity, as men who had obligated themselves to make such service the first—the only—object in life, there were others who had different views and opinions, other ideals and motives, some giving expression to thoughts that seemed to rest upon the idea that their life-work was more a mere wage-earning or commercial avocation than a professional vocation, to which they had been "called" by a desire to serve a world that is so very greatly in need of service.

The law says that we have no right to read men's minds, even if we had the unusual power so to do; that we cannot know purposes and intentions of other men save only as such purposes and intentions are expressed outwardly in and through words and acts; and that, because this is true, and because we have no other means of judging, we are quite justified in forming opinions concerning motives and intentions by the words that men speak and by the acts that they perform.

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*Read before the First District, Indiana, Dental Society, Evansville, Ind., 1917; The Toledo Dental Society; The Ashland-Richland Dental Society, 1918, and others.

Upon this basis we lawfully may judge the spirit, the motive, animating members of the learned professions by their acts, by the things that they do and say every day, rather than by high-sounding phrases vented in convention, in propaganda, and through the public prints.

Once more, let me impress upon you the difference between the mercantile and the professional ideal—a difference that seems to me as wide as the poles asunder, irreducible, irreconcilable.

It is the commercial ideal or motive to *get from* the world as much as possible for service rendered.

It is the professional ideal to *give to* the world as much as possible for that which is taken.

Fortunately it is true that many of our large mercantile concerns have outgrown the grab-game; that many of the really big men in the world of business are animated by the true spirit of genuine service, and that their business affairs are so managed; but it also is too true that many concerns that have adopted some slogan expressing the idea of service use that slogan merely as a cloak, an ambush, under and behind which the same sinister and self-destructive motives lurk. All is not gold that glitters.

If you are governed by the ideal, that is, by the purpose and the intention first mentioned, if your prime motive is to get as much as possible and to give as little as the law requires—you are not a professional man, but to you dentistry is a trade, an avocation, a business only, a means to an end, not a profession to be followed as an avenue for service.

I know well the temptation offered by the allied professions, medicine and dentistry. No occupation with which I am at all familiar offers such opportunities to the "get-rich-quick-and-get-a-plenty" sharks as do they.

Any man of ordinary common sense, equipped with financial cupidity and lack of conscience, can accumulate a fortune in the *business* of either medicine or dentistry in a very short time. Facilities for the practice of this sort of dentistry have increased tremendously during the past few years. When you and I were boys, the office of the dentist was a bare and dreary, if not positively repellent place. Today it is or may be a house of mysterious attraction, fitted up with cabinet, engine, switch-board, N_2O apparatus, X-ray machine, and a dozen other pieces of paraphernalia, tending to mystify if not to terrify and subdue the patient, the simple and helpful uses of which are more or less unknown to the layman, every piece of which tends, by its mere presence, to heighten the importance and increase the anticipated cost of even the simplest operation.

Personally known to me are several such mercantile "dentists" who seem to have taken for their ideal the outworn, piratical commercial motto—*Caveat Emptor*—"let the buyer beware."

You will find such men almost any afternoon, mounting their high-priced autos, and betaking themselves to lake, river or other resort, where creature comforts of a kind are to be had at a price (and they have the price), leaving their business in the hands of able assistants who know well how to make contracts and insert charges, however poorly able they may be to make bridges and insert inlays.

Fortunately for the dental profession, and for a world that stands so greatly in need of the genuine service of real dentists, such men are few and far between; and particularly in Indiana, I am told, their number is rapidly decreasing. But even many of the best men in the profession seem more or less imbued with the buying and selling idea. At various meetings last year quite a little was said both on the floor and in private conversation concerning the cost of dental materials and the relation of such cost to the fees to be charged. To my mind it seems that no such relation should be taken into consideration.

Every time I hear or read a paper on the use of amalgam in which the essayist or some discusser refers to the low cost of the material in comparison with gold, bringing out the idea that by the use of cheap materials the fees may be reduced, I am impelled to protest against what seems to me to be a violation of the true professional spirit. Such an idea should never occur to the dentist any more than to the physician, whose charges have no relation whatever to the cost of the drugs used.

Your business is to save the teeth and to preserve their usefulness; and you should follow the lead of the medical branch by using the material *indicated*, allowing your charge to rest upon quite another basis, to be mentioned later. If you succeed in your attempt to preserve the teeth you are entitled to as large a fee for amalgam as for gold or any other material. The *result* and not the material should determine.

In the case of complete dentures the cost of rubber as compared with gold amounts to nothing of course. In such cases tell your patient frankly that your fee for full rubber plate is a certain sum, to which must be added the value of the gold, at cost to you. You will be able to judge by circumstances when the subject of gold plate should be mentioned.

Dental fees, as I see the matter, should rest upon one foundation only—the service rendered to the patient, and through him to the community as a whole. The cost of materials, except in the case of gold plates, should be ignored entirely, whether the material is a few copper's worth of alloy or a few quarters' worth of gold. Nor should your time be given too much weight. Upon the basis of service rendered, a ten-minute sitting may sometimes entitle the operator to a larger fee than one of an hour or more. As a rule, dental fees very seriously need grading upward rather than downward. This the service-value basis for charges would take care of properly and ethically.

The time spent in your education has no proper place in estimating dental fees. The years so employed and the fees paid make up the price each student pays for the privilege of coming into contact with the accumulated and stored-up knowledge of the world, in order that he may fit himself much more quickly than otherwise would be at all possible to occupy an honorable place in one of the learned professions.

In the old days medicine and dentistry were parts of the Lesser Mysteries, for initiation into which the neophyte was called upon to give not only his time but large fees as well; and then, upon going out into the world, was compelled to take a most solemn oath to use the knowledge imparted to him solely for the benefit of humanity, without regard to person, or place, or condition, treating high and low, rich and poor, great and small, upon an exactly level basis so far as service was concerned, regardless of the probable fee, which in all cases was to be a purely voluntary matter on the part of the patient.

In the mysteries of antiquity we find the beginning of our modern school, college and university, and the fundamental principle underlying the Hippocratic Oath, to which every graduate in medicine must subscribe, either with his heart and soul or merely with the point of his pen; and here also we see the origin of the term "honorarium" as applied to the fees paid to professional men. As each initiate was sent out into the world to apply in practice the knowledge imparted to him, his ears rang with the parting injunction:

"It is not well with you. You have reaped—now must you sow. As you have been given, so must you give."

This injunction can have meant only that reward for service rendered was to be based upon the value of that service to humanity, not upon the cost of materials, time, preparation or anything of that sort. The cost to the operator was to be ignored entirely, and only the *value of the service rendered* to be considered.

This understanding seems amply warranted by the fact that some of the degrees in the mysteries of which dentistry and medicine, as well as mathematics, physics, metaphysics, music, etc., were parts, were much more costly than others; and that some of these degrees were entirely withheld from all but the very few. The minor degrees were open to all; but some of the major ones were given to carefully-selected neophytes only.

One of the major degrees required the sacrifice on the part of the student of two hundred oxen, the ox in Greece being the measure of value, our word "pecuniary" being derived from the word "pecus," meaning cattle. The cost depended wholly upon the value to the student of the instruction given in each degree, not upon the time required or materials consumed.

Most emphatically do I agree that "the laborer is worthy of his hire;" but in every case this "hire" should depend upon the *value* of the service rendered to the patient and to the community, not at all upon the cost of education, materials, time or anything of like nature, nor for merely "going through the motions" of rendering service.

Why, the pay of men in business depends solely upon their value, upon the value of their service, to the organization. In business results count, and nothing but results. There education, merely as time spent in study, counts for nothing at all. Of course, if education fits a man to render more valuable service, it is of advantage to him; otherwise it is simply so much lost time.

Identical operations, if there are such, are not always worth the same. Much depends upon the patient. Some men and women are worth much more to a community, in a financial sense, than are others. A man whose income is $100.00 a week is worth ten times as much financially to the community as is the man whose income is but $10.00 per week—and should give up a larger part of his share of the community wealth for equal service rendered.

This is by no means a new idea and is not offered as in any sense original. Its justice long has been recognized by the medical profession and by those served by that profession. Before the days of medical fees, when the compensation of the practitioner was a purely voluntary matter—an honorarium in fact as well as in name—very large sums were paid by rulers and wealthy men for such services. Records are extant in which court physicians are shown to have been extravagantly rewarded, even to the gift of whole provinces and position of great power and influence.

In our own day medical and surgical fees are still largely based upon the ability of the patient to pay. I personally know of a surgeon whose fee for appendectomy varies from nothing at all to $25, $50—and as high as $2,500.00. I am told that the great Mayo brothers, up at Rochester, Minn., have no other basis for charges.

I had a friend in Toledo who paid a local surgeon $650.00 for the removal of the appendices from two of the members of his family, in addition to hospital fees, and that friend stated that it is the aim of the surgeon to charge a month's income for ordinary major operations.

The financial value of the patient to the community, then, is one basis upon which to rest the amount of your fee. Another is the value *to the patient* of the particular operation. The comparative value. There are many major and minor operations known to surgery and the fees vary with the importance, *the value to the patient*, of the part operated upon. As the thumb or finger is of far less value to the patient, than the eye, the amputation of a thumb or finger entails a very small fee, while the removal of a cataract often calls for a very heavy one. Yet the lesser may require ten or a hundred times as much time as the other.

Now, you may say that you operate upon neither hands nor eyes—that your work is limited to one very small area of the body—the mouth. Of course, that is self-evident; but are you prepared to say that any one tooth is of equal value with any other; or that every operation upon every tooth of a certain type is of like value to the patient; or that all similar operations upon similar teeth are of equal value?

Value to the patient, mind you; leave everything out of consideration except that one point, plus the patient's own value to the community.

Take, for instance, two molar crowns. Time for preparation in one case, thirty minutes; in the other, treatment, etc., two hours; when completed both look alike. The first may be, in fact is very likely to be, worth many times as much to the patient as the second. Make fee accordingly. You are not selling materials; you are not a hired man working by the hour; you are a professional man, serving humanity by preserving and restoring health. Your fee should have nothing to do with either material or time, but depend solely upon results in benefit to the patient.

And of this value, this benefit, you and you alone must be the sole judge—you, and you alone, are in position to form any idea of such value. The elements that should influence your judgment are these:

First: Condition of tooth on presentation, which in turn affects the success of your operation with particular regard to masticating efficiency, esthetic effect, permanence.

Second: The value of that particular tooth in health, as compared with the value of the other teeth still in efficient condition in that particular mouth.

Third: The relative value of that particular tooth as compared with that particular tooth before it became diseased, when restored to the best of your ability, with reference to its usefulness in preserving health and life.

Service, Service, Service, Value, Value, Value:—these are the words I would drum into your ears until they drive out the tinkle of coin, the cost of materials, the time consumed and every other consideration.

And remember that you are the sole judge of the value of the service you render. What a weight of most honorable responsibility such an ideal places upon the shoulders of my friend the dentist; and what a man he will become if he squarely shoulders that responsibility! Responsibility makes men; the want of it the mere imitation. Difficulties exist solely that they may be overcome, and in the overcoming give up their power to Him that overcometh—and only such as he is fit to become a pillar in the great temple of humanity.

We are right now in the midst of an epochal period in the history of the world. The lurid sun of conflict will set upon a far different world than upon which it rose. No gift of prophecy is needed to see that immense financial changes are impending. The world already has learned that the dollar, the pound, the franc, the ruble, and the mark, are utterly without value in themselves. In fact, that value has to do with human welfare only. We cannot eat dollars nor wear them. Therefore, some measure of value must be found that is standard—that stands, that remains fixed and permanent, no matter what fate may overtake governments and systems of finance. Such a standard may be found in the bushel of wheat, as the Greek found it in the ox, which will sustain life and contribute to human health and efficiency just so much and no more, allowing for differences in the human unit.

Most of us have seen wheat sell as low as 60 cents per bushel and as high as $3.12. Here it easily is seen that price has nothing to do with value. The value of a bushel of wheat that can be bought at 60 cents is just as great as that other bushel that brings $3.12. The value of the wheat remains the same, yet something has changed; and that something can be nothing except the dollar. Certainly. The purchasing power of the dollar that bought wheat at 60 cents is more than five times as great as the dollar that bought wheat at $3.12.

Real things, intrinsic values, are stable; they do not change. And as this great fact is realized more and more completely as time goes on, the esteem in which the dollar is held will fall and fall, until at last financial systems as now understood will cease to exist and far more natural ones take their place. Then service for the sake of pay will become a thing of a barbarous, unhuman past, and service for the sake of service, for the sake of our common humanity, will become the rule of the life of man.

Such a period is as sure to come as is the triumph of democracy over irresponsible despotism, and we may as well prepare for it. It will come when men realize the actuality and the reality of values quite apart from all monetary consideration, when they will be willing to do their best work regardless of money return, when they have advanced another step or two and have been born into the real manhood which puts into the world the best it has—not in order that the best may be returned, but in the one sole spirit and ideal of service.

Now, all that I have done is to bring home to you the true professional ideal; the ideal of service for the sake of service, the ideal embodied in the Hippocratic oath of the medical branch of your profession. And such ideals, followed for the sake of the ideal, never yet have failed to bring financial success. On the other hand, let me tell you that the Dean of the faculty of one of our oldest medical colleges said to me many years ago: "Harter, I never have known of the success of one single physician who signed that oath merely with the point of his pen."

We all know that physicians make no distinction of person. Called to the bedside of poverty, the best they have is given. Called to the help of the wealthy, they can do no more, although, being wise, they are quite willing to allow a different opinion to prevail. And, of course, there are exceptions. There are mercenary men in the medical end, and I seem to remember hearing of a few still in the dental. When quite a kid I lived for a few months with a physician who invariably left his country calls until night, because he could charge double for them, even though he sat around half the day doing nothing. Did he win out? Well, twenty years afterward I was in his town and walked around to his office. There I saw his wife down on her knees, scrubbing the office steps! It is just possible that you know of such physicians and such dentists who seem just now to be making great financial headway; but unless you have the vision of a seer and are able to look ahead to the completion of the career of those men, you cannot say that they are successful. Many men who, in middle life, seem to be bounding toward success, fall down and fail miserably later on. Men who advance themselves at the expense of other men are living contrary to the great law and are not only setting up powerful currents that eventually are sure to work against them, but are at the same time weakening and reducing their own power of resistance, and are pretty sure to be swept into the discard at last.

You are familiar with that old saying attributed to Paul: "Brethren, be not deceived; God is not mocked. As a man soweth, so shall he also reap." Or, as I probably should interpret it, "You cannot fool the absolute by any pretense; you cannot pretend to be a professional man, pretend to serve, go through the motions only, and hope to get away with it."

Life is a reality, not a pretense.

The power that makes for righteousness is irresistible in the long run. It takes a mighty mind to put over a successful bluff.

Whatever the future may bring in the readjustment of national and social life we cannot now foresee; we must live in conditions such as we and the rest of humanity have made, here and now. But I know that the ideal set up is the one and the only one that will bring success right now. I have the pleasure of knowing men who are conducting practice along such lines—and they will say that not only has there been no decrease in immediate income, but a very large increase. Every man who is half a man always is willing to pay well and pay promptly for actual service, for value received.

Convince your patients that you are doing your very best for *them*, not for yourself, by being entirely frank and candid in all your statements to them. If you know, or are convinced that a certain operation is best for your patient, perform *that* operation or *none*. Never permit your patients to tell you what they want you to do. You alone are in position to diagnose the case and apply the remedy. In case there is choice between two or more operations, the value, not the cost, of which is equal, the patient may be allowed to choose—not otherwise. Did you ever hear of a surgeon who could be induced to amputate a leg just because the patient asked to have it done?

By firmly but kindly insisting upon following the course indicated by your diagnosis, you gain the respect and confidence of the patient, which is sure to improve your standing in the profession and result in a better class of patients, with increased appreciation for real service and ability to pay proportionate fees.

In the small cities and towns where the number of dentists is small, the ideal is no less an imperative one. Improved standing in smaller communities is much easier to gain and much more noticeable than in the large and more populous ones, often leading to opportunities for investment that result in competence; and in all communities there are three classes—the leaders, the workers and the floaters. The dentist should be a leader. He should dress himself around and about with the garment of importance, as one worthy of consideration and respect, because his ideals are such as to lead the entire community upward, toward higher and better things. And this is the position that I want every dentist to occupy worthily—and such a position is impossible so long as he is a mere mechanic and tradesman, engaged in the buying and selling of materials and disposing of his time at a rate per hour.

Every physical thing, every condition surrounding mankind as a whole or any particular individual unit in the great human brotherhood, is the product of thought. "As a man thinketh in his heart so is he." And as he is, deep within himself, so will his surroundings be. So long as a man thinks of himself as a more or less advanced mechanic, just so long will it be necessary for him to conduct his practice as a mechanic, whose work adds some value to the materials that he employs.

One of the Roebelings, the great bridge builders and engineers, said some years ago, that so long as men had to be driven by the spur of hunger or the fear of poverty to do their best work, just so long they would remain slaves to wages, salaries and fees. And that just so soon as men outlived that impetus to exertion, just so soon as men reached that stage of development in which they would willingly do their best work without thought of reward to themselves, just so soon would the shackles fall away from them, and the mere fact of birth into the world insure for every man in it an adequate livelihood, the standard of that livelihood depending entirely upon the value of the service rendered.

Now, I want every one of you to think of himself in the terms of service actually rendered to the world; to think of himself as a servant of mankind, not as a serf working for pay. If that thought can become the dominant factor in the consciousness of each of you, the wheels will have been started,the mills of the Gods will have begun to grind, and the flour from that grinding will be such an improved condition in every way within the ranks of your profession that there will be no more honored calling known among men than that of dentistry.

"Let him that would be chief among you be the servant of all."

"SOUP BONE" IMPLANT FOR THE CORRECTION OF DEFECTS OF THE SKULL AND FACE*

BY W. WAYNE BABCOCK, M.D., PHILADELPHIA

SURGEON TO THE SAMARITAN HOSPITAL, AMERICAN HOSPITAL FOR DISEASES OF THE STOMACH, AND GARRETSON HOSPITAL

IN THE FIVE CASES here recorded a prosthesis was obtained by embedding under the scalp or the skin of the face, portions of beef or mutton bone removed from the hospital "soup-kettle." The results are interesting as they are apparently contrary in many experiments—indicating that alien or devitalized bone introduced into the living tissue undergoes absorption or expulsion—and that such bone does not serve a useful purpose for the replacement of normal osseous tissue. It is evident, however, that most of the experimental evidence as to the transplantation of bone is based on experiments made on the long bones of the body, and it is quite possible that some of the results obtained in experimenting on bones developed from cartilage may not apply to those bones developed from membrane. We were, in one case, unsuccessful in transplanting a boiled bone from a recently amputated leg for a defect of the tibia, and have observed the rapid absorption of ivory pegs, although Lexer has even used masses of horn in the formation of new joints. At any rate, we can record the interesting clinical observation that large plates of dead foreign bone may show no external evidence of absorption or weakening two years after implantation under the scalp. It is probable that the dead bone serves as a scaffold for the ingrowth of new firm tissue.

CORRECTION OF DEFECTS IN THE SKULL

A defect of the skull may be objectionable on account of the disfigurement, the cortical irritation or epilepsy produced, or other symptoms due to static movements of portions of the brain through the opening. Congenital defects in the skull requiring correction are seen in hydrocephalus and cranial meningocele. Much ingenuity has been expended in the correction of these various defects. The area may be covered by portions taken from the outer table of the skull, used in the form of free transplants, or by an osteoplastic flap transplantation. Such osteoplastic closure has been found useful in small openings, but not so practicable for the larger ones. Alien substances, such as thin plates, often perforated, of silver, gold or other metal, have been used. Celluloid, ivory, hard rubber, horn, paraffin, cork and other materials have been embedded. Plates of sheet mica have been advocated by Kane.[1] Many of these substances are obviously undesirable. Silver filigree we found to be of insufficient strength, while Lane's plates placed in the form of bars across large openings in two instances were useful.[2] The alien substance may cause such a profuse serous secretion in the wound, or tissue irritation, as to necessitate removal. Paraffin and cork certainly should not be used. Autogenous tibial transplants have the advantage of being well tolerated, but require an additional operation with its added risk. Mauclaire[3] has filled these defects by transplants taken from the lower angle of the scapula, and by slices from the tubercle of the ilium, or from the great trochanter. Flaps of bone from the sternum were used in two cases by P. Müller.[4] An autogenous rib graft with attached periosteum was used by Kahle. These various substances are either laid over the defect or wedged into position, fixed by small hooks, which are dropped in drill holes placed in the edge of the adjacent bone or fastened by sutures, wires or screws to the skull, the pericranium or other tissue. The use of fat transplants to fill cranial defects we can hardly commend.

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*Read June, 1917, before the Section on Stomatology (A. M. A.), of which THE DENTAL SUMMARY is the representative organ for the dental profession.

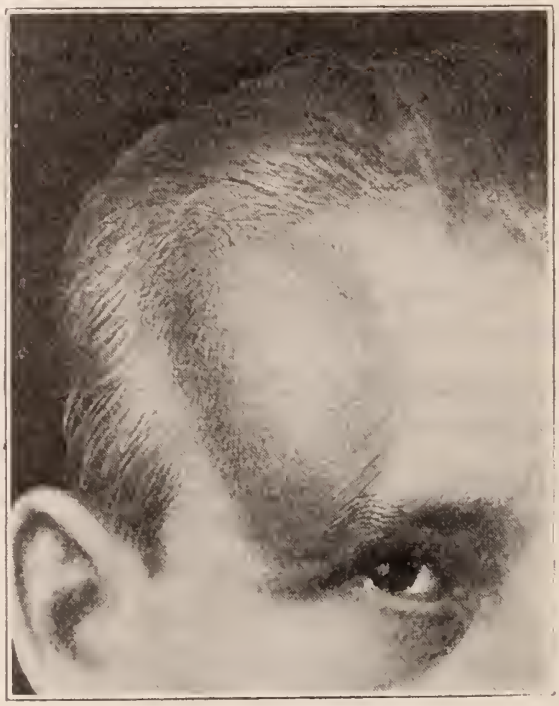

Fig. 1. Case I.—Character of skull defect before operation.

The "soup bone" implant here advocated has not only the advantages of convenient accessibility, mobility and sufficient size, but apparently produces, when embedded, little or no irritation of the adjacent tissue, and seems to give a strong and perhaps permanent closure.

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[1] Kane; *Railway Surg. Jour.*, August, 1913.

[2] Babcock, W. W.; Osteoplastic Surgery of the Face, *The Journal A. M. A.*, Jan. 16 1915, p. 203.

[3] Mauclaire; *Presse med.*, July, 1914.

[4] Mueller, P.; *Zentralbl. f. Chir.*, 1915.

TECHNIC

A bone taken from the soup-kettle has the advantage of having less animal matter than a fresh bone. Care must be taken, however, that it has not been rendered too brittle by prolonged boiling. The scapula, on account of its size, thinness and porous medulla, is preferred. Such a boiled bone of a sheep or ox is selected, rinsed, reboiled for one hour in a large quantity of water, then removed and placed over night in a 1.20 solution of phenol (carbolic acid). Previous to the operation it is again boiled for a third time for at least one-half hour in plain water. By this time most of the animal matter has been removed, the bone is somewhat softened, and can be readily cut into the required shape by a heavy pair of scissors, by bone-cutting forceps, or a heavy cartilage knife. The spine of the scapula is cut away, ridges and rough surfaces removed, the bone trimmed and contoured to the required shape and perforated by many drill holes placed about one-half inch apart. A flap of the scalp with its margin well beyond the defect is then raised, or a sufficiently long straight incision made over the area, the periosteum separated from the margins of the defect and stripped well back, and the prepared "soup bone" fitted into or over the opening, being contacted with the living bone and wedged or fastened under the margin of the raised periosteum. Fixation may be aided by a few sutures of chromicized catgut. Absolute hemostasis is important, and the skin margins should be accurately sutured in position, no drainage being used. The stitches are removed on the third or fourth day. If later there is a marked serous accumulation, this

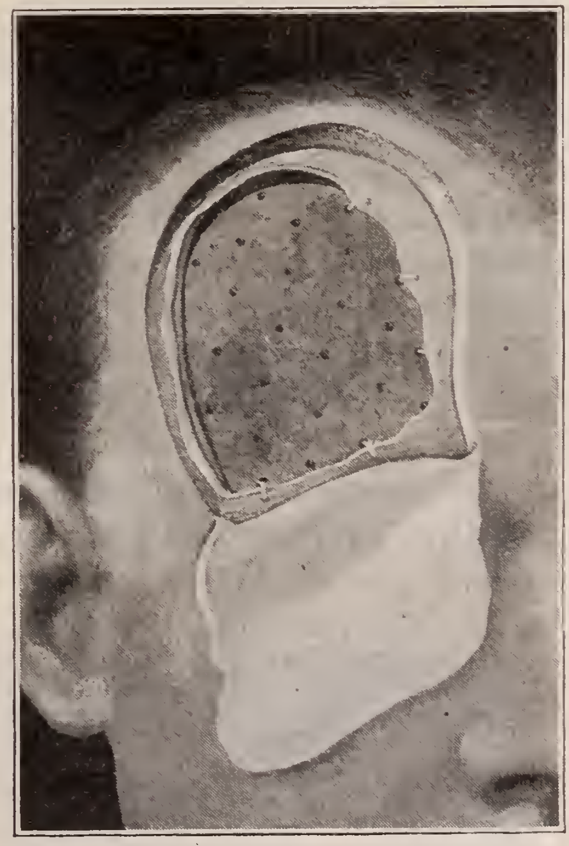

Fig. 2. Case I.—Flap of scalp turned back and piece of scapula (drilled) sutured to fit defect in skull.

is removed under strict aseptic precautions by introducing a grooved director through the wound, the opening made being permitted to close at once, as continued drainage would probably be followed by infection and expulsion of the alien bone. The bone soon becomes fixed in its new position and is probably early permeated by new blood vessels.

Case 1: Epilepsy and cranial deformity following osteotomy and injection of paraffin. Not relieved by removal of paraffin. "Soup bone" implant with relief from convulsions and good cosmetic result.

A. H., man, aged 33 years, German, laundryman, with negative family and previous history, in 1903, while cleaning a German service revolver, was accidentally shot, the bullet entering the temporal bone about two inches in front of the upper part of the lobe of the ear on the right side and ranging forward and upward. He was taken to a hospital in Bonn, Germany, and a part of the temporal and frontal bones down to and including a part of the right supra-orbital ridge removed. Two weeks later paraffin was injected to fill the large defect. The paraffin softened and gradually became lumpy and irregular. Nine years after injury he began having epileptic convulsions, at first every three months. The paraffin was removed in 1912, in Philadelphia. No relief followed, the convulsions occurring from two or three times a week to two or three times daily. The convulsions were preceded by formication in the scar, were initiated by retraction of the head to the left, and were followed by troublesome headaches. April 13, 1915, he was operated on at the Samaritan Hospital, a flap being raised along the lines of the two previous operations, dense adhesions separated, and a portion of the perforated scapula of a sheep fitted into the defect. The wound healed without irritation despite the large amount of scar tissue from the previous operations. The patient left the hospital in one week. A marked reduction in the number of convulsions followed the operation. Since December, 1915, or over one year, under small doses of ferrocyanid of iron, the patient has had no convulsion, and has been practically free from headaches. In September, 1916, he was struck a violent blow over the implant by a door, without harm. The contour of the frontal region is well restored, and after two years the edge of the "soup bone" can be easily felt and shows no sign of absorption. The implant is firmly fixed, painless, and apparently very strong. Some small overlying nodules of paraffin can be felt in the scalp.

Case 2: Large cranial defect with vertigo and epilepsy from palpation or movement. "Soup bone" implant with apparent perfect result after nearly two years.

M. L., man, aged 39 years, Irish, cowboy, was brought to the Samaritan Hospital, January 16, 1915, having been picked up unconscious on a trolley car. Examination showed a large defect in the skull, and palpation of the area was followed by a generalized convulsion. On regaining consciousness the patient gave a history of having been kicked in the back of the head some years previously, following which a craniotomy was performed. On standing there was a large cup-shaped depression in the right upper occipitoparietal region, and on bending over, the brain bulged through the opening, causing great vertigo, or an epileptic convulsion. Horseback riding (galloping), pressure over the depressed area, or nervous excitement, likewise incited convulsions. The patient therefore was unable to work. There is slight deafness of the right ear, and marked headache and pain near the right ear and back of the neck. Operation was performed February 3, 1915, under local anesthesia. A flap of scalp was raised and the dura and pericranium separated from the edge of the defect. A portion of boiled sheep scapula, perforated and trimmed to size, was fixed in the defect by fine chromic gut sutures. The implant was contacted with the living bone, the scalp being replaced and sutured without drainage. A transient hyperpyrexia, without other symptoms, attributed to alien proteins in the dead bone, followed the operation, after which the patient made a perfect recovery. In January, 1917, the patient reported at the hospital as being able to work and free from symptoms.

"Soup bone" prosthesis seems to be deserving of a trial in the correction of osseous deformities of the face and jaw where fat implantation is not feasible. For the correction of saddle nose, defects in the supra-orbital or infra-orbital ridges, depressions in the malar or supra-maxillary regions, loss of zygoma and for defects or irregularity of the mandible, the alien bone suitably contoured may be tried. In three cases of saddle nose we have introduced this form of dead bone, using portions of the spine of a scapula. In each case the alien bone was contacted to living bone, the technic being similar to that which I described before this section in June, 1914,[2] and that later was illustrated by Dr. John B. Murphy.[5]

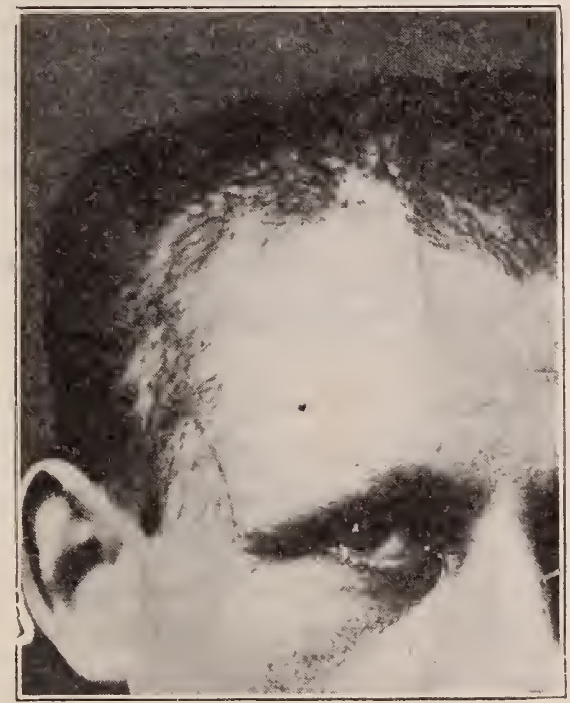

Fig. 3. Case I.—Photograph after healing had taken place.

In inserting implants for saddle nose we have experienced difficulty in securing enough mobility of the skin to raise the bridge of the nose to the required height. For this reason it has seemed desirable in certain cases to do the operation in two stages; at the first operation introducing the largest implant that can be employed without undue tension of the overlying skin, while at the second operation, performed some months later, another implant is superimposed on the first.

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[2] Babcock, W. W. ; Osteoplastic Surgery of the Face, *The Journal A. M. A.*, Jan. 16, 1915, p. 203.

[5] Murphy, John B.; Murphy's Clinics, August, 1914.

Case 3: Soup-bone implant for saddle nose. Result maintained after over one year.

A. K., woman, aged 25 years, single, with negative family and previous history, developed ocular symptoms at 8 years of age, and was treated intermittently with inunctions of mercury for three years. At the age of 12 years a perforation developed in the hard palate, and later necrosis of the bones of the nose, leading to saddle nose.

Present condition: Saddle nose with perforation of the hard palate and loss of the right tonsillar pillar. The Wassermann test is +. Patient was prepared for operation by the use of mixed treatment internally, and salvarsan and neosalvarsan intravenously and intramuscularly. Operation February 13, 1916, under local anesthesia. A vertical incision to the bone was made through a wrinkle line of the forehead, beginning at the frontonasal junction. Through the incision the skin was thoroughly separated from the underlying nasal bones by a pair of curved Mayo scissors. A portion of the spine of a boiled sheep's scapula was slid down from the forehead under the skin of the nose to correct the defect. The implant was contacted with the frontal and nasal bones. Some transient redness and inflammatory reaction followed the operation, perhaps due in part to the tension of the overlying skin, but primary union was obtained. Fourteen months after the operation the patient reports that she is married and pregnant, and that the implant has caused no trouble.

Case 4: Syphilitic saddle nose. Implantation of soup bone. Recovery.

M. L., girl, aged 18 years, with negative family and previous history, fell, six years ago, and broke (?) her nose, which remained sore, and for this she was treated in the Philadelphia Hospital for five weeks. Necrosis occurred which was arrested after one intravenous injection. The deformity —a marked saddle nose—has remained. The patient was admitted to the Samaritan Hospital, November 3, 1915, and on November 9, 1915, a wedge-shaped portion from the spinous process of a beef scapula was inserted through a vertical incision in the forehead and contacted with the frontal and nasal bone as previously described. The implant caused considerable tension of the overlying skin, and there was some inflammatory reaction, which gradually subsided under anti-syphilitic treatment. Primary union was obtained.

Case 5: A syphilitic saddle nose in a child corrected by a soup-bone implant. Bone not retained.

M. R., girl, aged 9 years, white, was admitted to the Samaritan Hospital, October 31, 1916, with a history that she had fallen the previous spring and injured the nose. The injury was followed by necrosis, and falling of the bridge of the nose, producing a marked saddle-nose deformity. Wassermann positive. Operation, November 11, 1916; anesthetic, ether. The incision was made in the left wrinkle line of the forehead to the frontal bone, and the skin of the nose raised and separated by blunt dissecting scissors. A bit of soup bone was suitably contoured, inserted, under tension, and the wound closed by interrupted horse-hair sutures. Some edema of the nose with redness followed. The patient was discharged November 5, 1916. Later suppuration occurred and the alien bone was removed.

DISCUSSION

Dr. George V. I. Brown, Milwaukee: I have never used soup bones. There are a number of interesting questions which arise, however, that I trust Dr. Babcock will speak of when the discussion closes. For example, it has been said that various implants used for saddle noses have, in the course of time, absorbed. Dr. Babcock did make some reference to that, but I should like him to elaborate a little and say what the experience is in that regard. Albee, of New York, who does wonderful bone implantation work, says it is necessary to have autobone grafts to get results; that the same results are not obtained with any animal grafts.

The cases referred to were interesting, inasmuch as there was present a definite factor which could be recognized; but I dare say that two years is hardly a sufficient time on which to base an estimate of the cure. I should like to know how long Dr. Babcock has had cases in which he has applied this graft, and how long a time his record of cure covers.

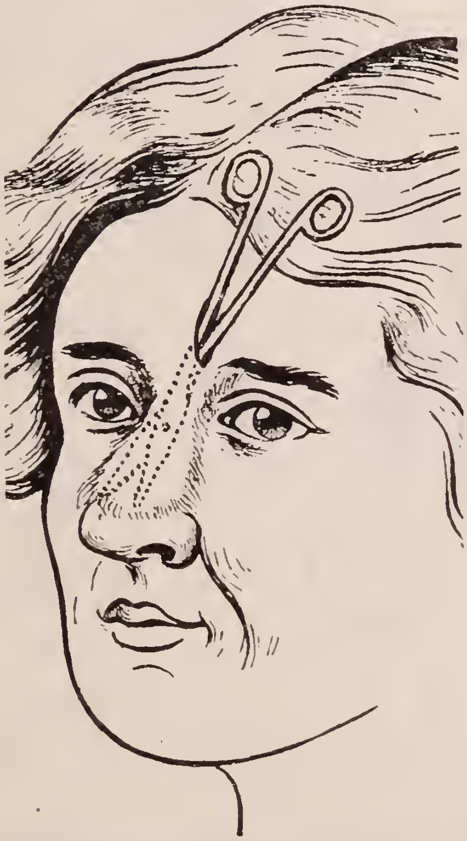

Fig. 4.—Line of incision for insertion of alien bone in nose.

Dr. T. W. Brophy, Chicago: In the raising of broken or flat noses, I have found it possible to get enough soft tissue alongside of the nose, in the muscular tissue, to accomplish the work. Even soft tissue will hold out the skin and give the nose a very good appearance.

A colored man came to our clinic with a necrosis of the entire mandible. I nursed the sequestrum along for months, cleaning the parts with antiseptics as thoroughly as possible, and there was in time generated a complete new mandible. We kept the skeleton or framework of necrotic bone there about which the new bone was formed, and then we removed the sequestrum piece by piece. We were obliged to remove small pieces of dead bone. An artificial piece, no matter what, put in position so as to hold the soft parts in place until the new bone can be generated, will prevent the collapse of the chin and prevent the intense facial deformity by holding out the parts until cicatrization is complete, even though new bone be not formed. In that way we are able to retain the parts in their proper place and get a very good result. The sequestrum serves the same purpose as an artificial piece.

Dr. C. B. Cortright, Brooklyn: In regard to the lacrimal duct, in overcoming the saddle-nose deformity, is there any distortion, and do the tears run down on the face? Is there any marked difference in the cornea?

Dr. W. J. Younger, Paris: Morestin, of Paris, uses a portion of a floating rib to supply noses. I have seen very respectable noses given to the soldiers.

Dr. W. Wayne Babcock, Philadelphia: What happens to the implant, as time goes on? We can simply refer to what we have seen in two years. With bits of firm material, like ivory, that have been embedded, we have found in a few months signs of marked absorption. We have been able to watch a subcutaneously imposed bone and find in two years no evidences at all of its absorption. Whether it will be absorbed in time we cannot say.

The subject of bone regeneration and transplantation does not seem to be absolutely settled. Some one settles it for a few months and then some one else further experiments and upsets the matter. John B. Murphy felt sure that transplanted bone would be compacted with other living bone, and that there would grow into the canals of the transplanted bone new blood vessels from the bone with which it was placed in contact. Others have claimed that this is not so and have tried to prove it, and yet there is much to indicate that there is a big germ of truth in Murphy's idea. Some believe the periosteum has nothing to do with bone regeneration, and have shown by many experiments, where the periosteum of the lower jaw has been scraped down, that bone does not generate. The periosteum may be a limiting medium, and yet, on the other hand, there is ground for the belief that there is an inner layer of cells which may have something important to do with bone regeneration. Will a dead bone serve as a scaffolding? We do not believe dead bone remains as dead bone in the tissues, but if it can stimulate bone with which it is in contact to send into its porous structure new blood vessels, and can replace this alien bone by living material of an osseous or sufficiently firm nature to

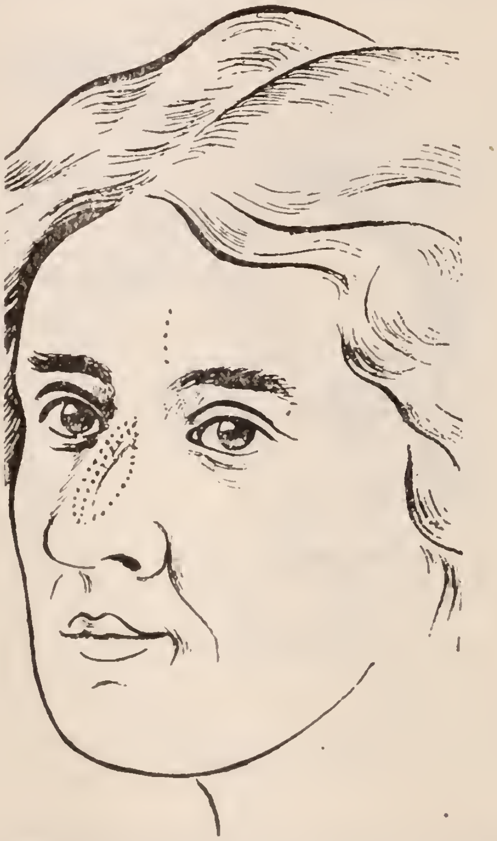

Fig. 5.—Method of preparing pocket for insertion of alien bone in nose.

give a support and contour to the skull, then we have accomplished all that we wanted to accomplish. It is not that we want to keep the soup bone in the patient's head, but to fill up the defect with something that will take the place of what was lost and correct the deformity. In the skull evidently, conditions are better than in the face, although the skull does not reform bones as do other bones of the body. After fractures of the skull we do not have secondary callus formation, and we do not have in gaps of the skull much regeneration or replacement. A saddle nose, as Brown has suggested, is a different problem. It occurs in a syphilitic, and we know how hard it is sometimes to stop the progress of a necrosis which leads to saddle nose, and even with our best treatment we sometimes cannot arrest the process. A patient I know of has had twenty-six injections of salvarsan and yet retains a positive Wassermann. When we put in a dead substance in such patients we tax the tissues and there is considerable chance that the irritation will do harm.

The same condition obtains when we transplant from the rib, from the costal cartilage or from the tibia. Some transplants are retained, and some are expelled; and we think it likely, in answer to Brown's question, that some of these bits of dead bone that we put in will likewise be absorbed, if they are not expelled; and yet the fact that we have retained, for two years, in one of our patients, a mass which appears to be bone, makes us feel that this is worth trying.

In none of the cases in which we have implanted have we observed any serious trouble. The tissue about the cornea gives us the least trouble. It is relatively elastic; it is the firm tissue over the bridge of the nose that gives us more trouble. We have difficulty in raising it up to the point where it should be, if we separate the tissues from the nose and cheek.

DENTISTRY IN RELATION TO PATHOLOGY*

BY EARNEST SCOTT, M.D., COLUMBUS, OHIO

MEDICINE of the present day is characterized by its wide-spread and intense interest in scientific research. The old-time family physician who practiced medicine as an art, empirically, has gradually given way before the advance of medical science. Scientific methods applied to the diagnosis and treatment of disease have transformed medicine until it has taken its place among the well-established sciences. Today the microscope, the incubator and the X-ray tube are considered as prerequisites for medical practice. This spirit of investigation has not only become a dominant factor in the practice of medicine, but has virtually revolutionized medical education, and has aroused extended interest in the minds of many laymen. Some of these having abundant wealth have established large endowments for the maintenance of special laboratories where such work may be carried on under the most favorable circumstances. As a result of such gifts we have the Rockefeller Institute for Medical Research, the Sprague Memorial Institute, the Croker Fund for Cancer Research, the Mayo Foundation, the National Dental Association Research Laboratory, the Huntarian Laboratory of Johns Hopkins, and many others. In almost every university there are now research professorships and fellowships. This change of attitude in the medical profession was appreciated by the leaders of medical education some years ago, and they realized that the medical schools were not meeting the demands of the situation, and that if they were to measure up to the new standard, changes would have to be made and higher ideals would have to prevail. This finally resulted in the formation of the Educational Council of the American Medical Association, which took upon itself the task of determining just what educational facilities were possessed by each of the medical schools of the country. Shortly after this the Carnegie Foundation turned its attention to the subject of medical education and instituted a second inspection of the medical colleges. These investigations proved ultimately that there was a wide variation in the amount and quality of the work required in the various schools, some institutions affording all that could be desired both in the way of curriculum and equipment, while others possessed little of either. The Council of the American Medical Association adopted certain standards for the grading of the schools, approving those institutions that they found to be fulfilling their requirements and establishing a goal for those that failed to do so. By thus drawing public attention to the conditions existing in the lower grade schools and to the advantages of the better and more scientific training possible in the best schools, a condition soon arose in which many of the poorer schools could not obtain a sufficient number of students for their maintenance.

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*Read before the Columbus Dental Society, 1917.

The final result of this awakening has been that, while the suggested reduction to thirty-one medical schools made by the Carnegie Foundation has not been accomplished, there has been an actual reduction from one hundred and fifty-five schools existing in the United States in 1908 to ninety-five at the present time. Of these, fifty-two require two full years of college work for entrance, thirty-three have one year of college work required, and ten admit students upon presentation of a high school diploma; and I might add that none of these ten last mentioned are recognized by the State Medical Board of Ohio.

Dental education is at present undergoing a similar revolution. Through the activities of the National Dental Association and the Dental College Association, a National Dental Educational Council has been formed that is having much the same effect upon the dental education of the country that the Educational Council of the American Medical Association had upon medical education. This council by its suggestions has already lengthened the dental courses in some schools from three to four years and has increased the entrance requirements from four years of high school to one year of college work. These changes have not, however, been brought about for the mere purpose of keeping up with the advances made by the medical schools, but have largely been stimulated by a change in the viewpoint and a broadening of the field of dental work. This has been brought about by a number of significant examples of the advantages to be derived by the application of laboratory research methods to dental problems. As a result of these investigations, the dentist can no longer limit himself to the mere mechanical problems presented in the filling, extracting or replacing of teeth, but is forced to go behind the scenes and determine the fundamental pathological changes underlying the conditions being treated. The dentist is gradually being placed in the position of considering the condition of the tooth as only a symptom of disease, and of understanding that the relief of the symptom may not be all that is demanded in the treatment of his patient.

The work of Hartzell, Smith and Barret, Bass and Johns and many others in the investigation of pyorrhea has demonstrated the possibilities of research methods when applied to dentistry, and has emphasized the necessity of greater consideration being given to the pathological condition about the tooth as well as within it. Although the exact etiological factor has not yet been determined and no specific treatment has as yet been discovered, the work done upon this disease has been more than repaid in the stimulus it has given to the study of various other pathological conditions of the mouth and gums. It was shortly after this work upon pyorrhea that Rosenow and Billings began their important study of the relation of focal or localized chronic infections to the various diseases of the body. This subject has become one of the most important and most discussed in dental and medical literature, and has interested a large number of investigators. The importance of the subject may be appreciated when it is known that many of the diseases that have long puzzled the physician are apparently accounted for by the presence of these focal areas of infection. Billings gives the following list of such diseases: Acute rheumatism, malignant endocarditis, myositis, myocarditis, pericarditis, septicæmia, nephritis, various visceral degenerations, thyroiditis, pancreatitis, peptic, gastric and duodenal ulcer, arterio sclerosis, chronic neuritis, chorea, erythema nodosum, herpes, spinal myelitis and iridocylitis.

To this list Wright adds the following: Secondary anemia, urticaria, furunculosis, eczema, diabetes, pupura hemorrhagicum, asthma, chronic catarrh and nervous breakdown. Maier cites cases of anorexia, tachycardia and asthenia, as due to chronic focal infections. Such infections have been found in and about the mouth, the teeth, the tonsil, the gall-bladder, the appendix, and Young has within the past week published an article in which he proves conclusively that such foci of infection may lie in the prostate gland or vesicles. Ulrich, in an attempt to correlate oral sepsis with systemic disease, especially rhumatoid conditions, made special examinations in seventy-six cases in which he found streptococci alveolar abscess. Thirty-nine of these cases were afflicted with rheumatism, thirty-three had cardiac disease, thirty-three had a secondary anemia, twenty had pyorrhea and nineteen had albuminuria. Many other disease conditions, such as neuritis, bronchitis, nephritis, etc., occurred a less number of times.

He states, after the examination of five hundred cases by means of the X-ray, that "the findings are as startling as they are significant." A little over sixty-eight per cent. of all artificially-devitalized teeth were found with apical abscesses, and the total number of abscesses on thirteen hundred and fifty dead teeth, including those found on pulpless teeth due to caries or accident or proximal fillings, was eighty-three per cent. He further states that of one hundred and fifty-nine of these cases examined bacteriologically, one hundred and fifty showed the infecting organism to be the streptococcus.

Rosenow has done a large amount of work bearing upon the question of the affinity or tropism of streptococci for the organs or tissues from which they have been isolated. His investigations tend to show that there is an affinity of special strains of streptococci for certain tissues, and that specimens collected from lesions of an organ or part, such as the appendix, when injected into an animal, produce in a large percentage of cases similar lesions in the same organ. His results show that fourteen strains isolated from the appendix produced lesions in the appendix of sixty-eight per cent. of the rabbits used. Eighteen strains isolated from the stomach produced ulcer or hemorrhage in the stomach in seventy-four per cent. of the cases. Twenty-four strains from rheumatic patients produced arthritis in sixty-six per cent., endocarditis in forty-six per cent., and myocarditis in forty-four per cent. of seventy-one animals used. Strains from the lesions of erythema nodosum produced lesions of the skin in ninety per cent. of twenty animals. These percentages are in every case far above those obtained when cultures from other sources were used.

Henrici, working under the auspices of the National Dental Association, has recently, in a series of two hundred and twenty-five animals, been able to confirm a large part of the work of Rosenow regarding the production of systemic diseases by streptococci and has proved that all types of the streptococcus are virulent, and that under proper conditions they will produce typical rheumatic and endocardial disease in rabbits, producing in many instances the so-called Aschoff bodies, which are considered diagnostic of rheumatism.

Gilmore, writing upon the subject of "Chronic Alveolar Abscess and Systemic Disorders," cites a series of one hundred and seventy-eight rabbits injected with cultures of streptococci from cases of alveolar abscess, and concludes that such organisms produce lesions in rabbits more frequently in certain organs, i.e., the stomach, muscles, joints, endocardium, kidneys and jaws. He further determined in this series that those cultures obtained from patients suffering from rheumatism or systemic disease in addition to the alveolar abscess were more virulent than those from abscesses not accompanied by such diseases.

The clinical as well as the experimental proof that focal infections are a source of danger, and that they bear a very intimate relation to systemic disease is also very convincing. Numerous writers upon the subject testify that the beneficial results obtained by the removal of such foci is, in many cases, remarkable. Young says: "The marvelous way in which disabled rheumatic joints and myocardial conditions disappear and patients who have been invalids for years get well in a few weeks, is one of the wonders of modern medicine." The general interest that the dentist might have in this subject is changed to one of concern and responsibility when he learns that Billings, after a careful survey of the subject, asserts that such areas of infections are usually found in the head as apical or alveolar abscesses, tonsillar or peritonsillar abscesses, or as a chronic sinusitis. Nor is testimony lacking that in these cases remarkable recoveries from systemic diseases have followed the treatment of pyorrhea or the elimination of old alveolar abscesses. Editorial comments in the *National Dental Journal,* November, 1916, upon the work of Henrici, as cited above, states "that it would seem to indicate that more than fifteen per cent. of the beds in charity hospitals could be emptied by applying our present knowledge in the care of the sick poor."

It becomes evident, then, from this brief summary of the investigations upon focal infections, that it is a subject of vital importance to the dentist, and that it has become mandatory that he shall have a thorough knowledge of the fundamental principles of infection and the resulting tissue reactions. The close relationship existing between these infections of the mouth and the systemic diseases emphasize the fact that the dentist should be familiar with medical diagnostic methods, in order that he may be able to recognize the symptoms of such diseases and be able to advise his patient intelligently concerning them.

A further responsibility that is being placed upon the dentist is the recognition of the various forms of malignant tumors occurring about the face and mouth. Hoffman presents statistics which show that there were eighty thousand deaths from cancer in the United States during the year 1915. Of this number, three thousand one hundred and fifty-two, or three and nine-tenths per cent., were of the buccal cavity.

Medical research has established the fact that cancer is a local disease in its beginning, and that every case might be cured if treatment (operation) were performed early enough. And what is true of cancer in general is especially true of cancer of the mouth and face. Bloodgood has shown by his experience that an early diagnosis and prompt radical treatment will cure eighty per cent. of such cases, and states that this number may be increased to one hundred per cent. if the diagnosis is made sufficiently early. As has been stated by Means and Forman, "The operative technic of tumors of this region has reached a high state of perfection, and if further advance is to be made against cancer of the buccal cavity, it must be by the earlier recognition of the disease." There is, then, a grave responsibility placed upon the person first seeing these cases, and this person in the natural course of events is frequently the dentist.

Since being called upon to write this paper, I have witnessed the sad results of ignorance regarding the nature of cancer. A woman, aged 52, came to the hospital for the relief of a difficulty she was having with her lower jaw. This woman had about a year previous to this time noticed a small nodule on the inner surface of the gum on the lower jaw. It grew slowly, but finally became so large that it caused her some inconvenience because of the irregularity of the teeth over the mass. She consulted a dentist, who at first passed the matter off lightly, but finally extracted the affected teeth. As a consequence the cells of the tumor started on a wild career of growth that had more than doubled the size of the tumor in the interval of two weeks between the time of the extraction and her entrance into the hospital. The patient and her husband were told frankly that an operation if done at all must include the resection of a large portion of the jaw and a dissection of the cervical lymph nodes, and that even this was only temporizing. The patient refused operation and returned to her home to die. Thus a case that might have responded to operation at the time she was first seen by the dentist was rendered hopeless because he failed to recognize the true nature of the disease and blundered in his method of treatment.

Malignant cases of this type occurring as they do most frequently on the lips, tongue or cheek, must in many instances be seen in their earliest stages by the dentist, who, though he be consulted for some entirely different ailment, should be able to make a diagnosis and to recommend the proper treatment. The public as well as the members of the profession are at fault in this matter, and if good is to be accomplished along these lines there must be an energetic campaign of education, including the public, the physician, and especially the dentist, for the early diagnosis and the radical removal of all suspicious tumors.

I am convinced that the duties of the dentist to his patient do not end even here, for there are various other conditions occurring about the mouth that he should recognize. Such diseases as syphilis, tuberculosis, measles, diphtheria, scarlatina, tonsilitis, the various forms of acute stomatitis, and such drug poisonings as lead and mercury, give early and definite symptoms in the mouth and throat. The physician who neglects to look at the tongue of his patient in the course of even the most casual examination is apt to be considered careless and untrustworthy of his patient. If, then, the appearance of the tongue means so much to the physician and to the mind of the patient, should not the dentist, who devotes his entire time to the buccal cavity, be able to read these signs and to advise his patient as to their meaning? Such other conditions as hypertrophied tonsils, adenoids, cervical adevitis, the various skin lesions about the face and mouth, should also be recognized by the dentist who is to serve in his highest capacity and who is to do the greatest good for humanity.

It seems to me, then, that the dentist is destined to become an oral hygienist, whose duties will be largely in the field of preventive medicine and who, while possibly caring primarily for the teeth and their investing tissues, will at the same time take into consideration all of the signs and symptoms of pathological change presented by the patient and.be able to treat or at least intelligently advise his patient regarding his condition.

Dentistry, like ophthalmology, otology and laryngology, should be considered a special branch of medical practice, and there is just as great need that the dentist understands thoroughly the broad, underlying fundamentals of pathology and of medicine—yes, even greater need than there is that the specialist whose practice is sharply limited, should do so. There long has been a law compelling those who treat the eye to have a medical degree, while the dentist's education has consisted largely of the purely mechanical manipulations necessary for the caring for the teeth. There is legal permission granted in Ohio for the mechanical fitting of glasses for the correction of errors of refraction, to those who have no medical degree. This, however, bears much the same relation to the entire field of ophthalmology as does the mere mechanical pulling of a tooth or the filling of a cavity to the new and broader view of the up-to-date dentist.

It is considered necessary today that before any medical graduate is prepared to enter special practice such as that of the eye, the ear, the throat or the nose, he shall spend months or years in special preparation for the work he has chosen. At the University of Minnesota there is a graduate course in ophthalmology requiring three full years for its completion. If then, it is considered so important that these special practitioners should be so thoroughly prepared for their work, what of the dentist, who has a larger and much more important field than any of these? Is it not time that the dentist should grasp the opportunity presented and prepare for this larger field of usefulness? At present Columbia University prescribes for the dental course the same entrance requirements and the same studies for the first two years as it does for the medical course, the strictly dental branches being taught in the junior and senior years of the course. But in the light of the developments during the past few years is this sufficient preparation for the dentist of the future? Should he not have a full four-year course of medicine and one or two years of graduate work in which to complete his strictly dental knowledge?

That my conception of the future is not entirely visionary and out of reach, allow me to quote a few references from some of the prominent dental magazines of the past few months:

Dr. Talbot writes in THE DENTAL SUMMARY of June, 1916: "A knowledge of the diseases of the body at the present time requires us to change our viewpoint as to the object of the dental profession. The health of the patient and his tissues should ever be foremost in the minds of teacher and dentist."

Dr. A. W. McCullough, in his presidential address before the Odontological Society of Western Pennsylvania (DENTAL SUMMARY, December, 1915), says: "When you realize the way in which we are now being recognized by the medical and other professions and by the public at large, as guardians of the most important gateway to the body, the gateway that is responsible (as has been proved) for the infection of some of the most dire diseases the body is heir to, when you grasp the significance of this, then the importance of our position is borne in upon us."

Dr. A. D. McConahie, in the *Dental Cosmos* of November, 1915, writes: "The oral specialist must realize his work for humanity to be larger than the mere filling and replacing of teeth. He must look beyond the mouth to the physical condition of his patient in order that he may determine whether the oral condition has produced disease elsewhere, and if necessary, aid the physician in its treatment."

THE APPLICATION OF BUSINESS PRINCIPLES TO THE PRACTICE OF DENTAL SURGERY*

BY DELOS L. HILL, D.D.S., ATLANTA, GA.

A PARABLE was spoken when it was said that "Dentistry, as a means of service, is a profession; but as a means of livelihood it is a business."

When I entered college to obtain my dental education, a level-headed, conservative business man advised me against it, saying that I could make more money in other lines. In answering him I called attention to the fact that the trouble was not in the profession, but in the failure of dentists to apply business methods in every-day practice. It is a deplorable fact that the financial condition of the average dentist, in full practice, is not such that the greatest number of the highest type of men are attracted to it as a life work, for the reason that they are able to do better, financially, in other lines, and in trying to present this subject in a way that will be beneficial to my confreres, I will attempt to discuss dentistry from an economic standpoint, cost of dental service, the relation of costs and receipts, ability to impress the public, office assistants, records of services and purchases, and the future.

DENTISTRY FROM AN ECONOMIC STANDPOINT

If you will question your dentist friends as to what prompted them to take up the practice of dentistry, some may avoid the question and say they do not know; but if they will be frank and honest, a great majority will tell you that it appeared to them to be an acceptable way to earn a livelihood and to make money.

It is all well and good for us to talk about the altruistic and the humanitarian side of the subject, but altruism and humanity are almost unknown to the young man who is starting out on the journey of life. Before he is through his college course the idea of the practice of dentistry for a livelihood is made secondary to that of service, which, together with our responsibility to our fellow man, is stressed at every opportunity by the faculty of his college. It is, indeed, unfortunate that a thorough business course, as applied to the practice of dentistry, is not made an important part of the curriculum of every college. But, with the exception of a few general talks on business lines, very little if anything is said on the subject. As a consequence at least the first few years of practice are apt to prove very disappointing to the young dentist, and many of them will fall by the wayside, after the gilt and glamour have been effectually effaced by poor practices, heavy expenses and the inability to meet current obligations as they fall due.

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*Read before the Georgia State Dental Society, 1917.

I would not deprecate, in the least, the *service* side of the profession, but any one who thinks of this side only will surely come to grief, financially. He must recognize the fact that his grocer and his tailor cannot and will not sell him goods merely for the pleasure of his account on the books.

THE COST OF DENTAL SERVICE

Did you ever stop and think what it costs you, the operator, to perform any dental service? This subject is generally handled from the standpoint of "value to the patient, rather than cost" to the operator. We often have heard it said by some of the old landmarks of the profession that no reasonable fee is too great for an operation well performed, and while that may be right, yet the only equitable, safe and just method of arriving at the value of anything is cost of production, coupled with the laws of supply and demand. Therefore, values of commodities, as well as professional services, vary in different localities, not so much from the point of the "cost of production" as from that of demand for that particular service, or commodity. You might take an ounce of platinum that would sell for, say $75 in New York, down to Red Oak, where there was no dentist or jeweler, and you could hardly give it away; and the people must recognize the necessity for good dental service or anything else before they will be willing to pay for it.

But what enters into the cost of every dental service? First, the average dentist has spent at least three years in dental college, and a conservative value of the time and the amount of actual money expenditure to him is about $2500. Of course, there are some who work their way through college, but that generally is caused by necessity rather than by desire and is not usual. While this amount may be excessive in some cases, it is too small in others, for some men have given up positions paying them from $100 to $150 per month to gamble on the outcome of a dental career, and in a case like that the cost is very high—and much higher if he should lose.

Now, how are you going to arrive at the value—to yourself—of your time that you are putting at the disposal of the public, or on the public market? If you will consider what other men in other lines, about on a parity with yourself and your station in life, are making on a salary, this will show you, at least, what employers are willing to pay for the service of another. Of course this is, or may be, taken only as a starting basis to work on, and whether it is too high or too low will soon adjust itself. I am constrained to believe, however, that it is a much safer basis than to blindly accept the current fees in vogue in the community in which you reside. When the fees are exceptionally low a young man will be compelled to accept less remuneration to start with, and the larger fees which are commensurate with the skill of an experienced operator will come as ability has been demonstrated.

An employer pays for the full time of the employe, so that if you can earn the same net income, or nearly so, as you would have been able to earn from other lines of endeavor for the first two or three years of practice, I should say that you have done well. Bear in mind that you are not going to work but about two or three hours per day for a while, but based on 1,000 actual working hours at the chair (which is, if anything, above the average), your time alone should be worth from $1 to $2 per hour. If you attend closely to business you should have about 293 working days in the year, giving you 52 Sundays, 6 holidays and 14 days' vacation, including dental society meetings, of each year. If a young man can average three hours' actual work at the chair per day for the first two or three years of his professional career, he ought to be satisfied. This will figure out 879 working hours, for which he thinks he ought to earn a net income of $1000 or $1500 as the case may be, and is a matter for him to determine. To this he must add his material bills and general expenses, such as rent, light, heat, phone, laundry, stationery and the hundred-and-one things for which our money goes. You may figure on your material bills and general expenses being from forty to fifty per cent. of your total gross business. This is higher in small practices, gradually diminishing until you reach the maximum of your own personal efficiency, and then increasing again when you take on non-productive assistance. Taking thirty-three and one-third per cent. as an average in full practices (which I think is too high), but is from six to ten per cent. less than the actual figures will show in your own offices, you would have to have a practice of $1500 per year to net you $1000; *provided* you collect for all the operations you perform. The chances are that you will be compelled to place your time at not less than $2 per hour, for you are going to fall far short of the full 1000 working hours for many years. Someone will ask where I get 1000 working hours per year as a basis, and I must say that to a certain extent this is arbitrary. There are no so-called authorities on this subject, though I believe it was Dr. J. Foster Flagg who first made the statement that a dentist would do more actual work in his professional career by working only 1000 hours per year, for he would be able to work many more years.

I fully am aware of the fact that many of the dentists here are heartily disagreeing with me in that they *think* they are busy *all* the time and are working at the chair fully double this number of hours, but until you have taken a record of your actual time at the chair for many months, which ought to give you a reasonably correct average of your working time, I will ask you not to be too certain of what you are doing. The working time at the chair is the only thing you can count on for immediate results or quick assets.

I have not been keeping my own record on this line long enough to give me correct information, as I would wish the entire year before stating my figures as facts, but from what I can deduce from my records of five months now would lead me to believe that I would average about 1700 hours per year, but I do not believe I actually do it. I think it would come nearer to 1500 hours per year and would caution even the older men in the profession from coming to any conclusions along that line without the actual facts to warrant the conclusions. Personally, I think the basis of 1000 hours is too low, for an average, and that we should raise the basis to at least 1500 hours. Then, if you were not working 1500 hours each year at the chair you would be below what you should be doing, and should you be so fortunate as to be kept busy more than that length of time, your income would be proportionately increased.

The percentage of thirty-three and one-third per cent. allowed must, of necessity, include a wear-and-tear allowance each year for your equipment. This allowance should be twenty-five per cent. for the first year and ten per cent. for subsequent years. New hand instruments should be charged to your merchandise or maintenance account, and nothing should be charged to fixtures except the heavy equipment and your original instruments. It not only is advisable but absolutely necessary to charge off at least five per cent. on your investment for your dental education, although I doubt the ability of the younger men to do this for the first five years. However, it must be caught up later, as this investment must be refunded. Geo. W. Clapp suggests the taking of a twenty-year endowment insurance policy, which will insure your being paid back for your investment at a given time, provided you can keep up the premiums.

So, as a basis, a young dentist starting out will have to place his time at the chair at a valuation of say $2.50 per hour, to insure an income of $1000 to $1200 per year. After that he may increase his per hour fee as his practice will warrant it, as the public will let it go only to such a figure as it (the public) thinks it is worth. Take, for instance, if you are making $2000 per year and should decide that you are worth $5000 per year net, you probably will find that the public does not agree with you, as you will have to increase the per hour rate to such a figure that the public will not pay it. The increase will have to be made gradually and as your services are in demand.

In this connection I wish to call your attention to the inflated idea of the value of the services of the young dentist, in his own mind. It is well to have a good opinion of one's own self and one's own ability, but don't mislead yourself in thinking that because you have the title of D.D.S. from a reputable dental college you are on the same professional plane as men who have given twenty to thirty years to the practice of their profession. The public don't think so and you will not be able to command the same fees, even though you might be able to do the same work.

With this per hour fee determined, it is easy to ascertain the cost of any operation You know how long it will take you to make an alloy filling, or a gold inlay, of the particular kind in hand. I do not think it wise to make an excess charge for the gold in an inlay or the teeth in a denture in making the price to the patient. The cost of these materials is in your merchandise account and figured in the cost of doing business, and it will come out the same in the year's work. Of course, in some localities where there are prevailing prices for certain operations, they may not be the correct fee from your particular standpoint, but it will be well to take due notice of such prevailing fee, at least until your practice is firmly enough established to make fees of your own. Such is the case in the fee for crown and bridge work in this city. While some of us will make money at a fee of $10, others will not, and it is for them to decide whether they are able to command a larger fee.

Many of us go into and complete difficult operations, involving long series of treatments, and when they are completed have no conception of the amount of time that has been used in doing this work. It is an injustice to yourself, to the patient and to your profession, to remove the nerves, fill the roots and insert a large compound alloy filling for $3.50, and it is especially harder on the younger men who have been told to hold up fees and keep the profession on a high plane. An operation of this kind will take from one to four hours of the hardest kind of work on your part, and the fee should be commensurate with the service performed. It is a fact that many of us will treat and treat and treat root canals and charge the operation at the same fee as one that takes only half as long, while some dentists make a habit of treating inflammation of the gums, time and time again, and make no charge at all. If it is worth anything it is worth a fee, and it is worth just what you charge for it in the eyes of the patient. For this reason many of the older dentists are doing treatment work for far below what it is actually costing them and thereby doing an injustice to themselves, but a greater injustice to the younger men. To apply this locally, I wish to refer you to a story related to me by one of our members, just as he related it to me.

He said, "I made a charge of $7 for some root-canal work and the necessary alloy filling. The patient had come to me from one of the best dentists in the city and a man reputed to get as good prices as any of us. Therefore I was surprised when she complained of my charges, stating that Dr. ——— had taken several X-rays and treated the roots of the adjoining tooth many times, and had charged her only $6 for the completed operation." The younger man was getting a fair fee for his work, but the older dentist was losing money, and the worst part of it was that he was doing an injustice to all of his younger professional brethren. Patients expect the older men to demand larger fees for their work, and as far as their means allow, they are willing to pay more, but when you see a dentist's reception room crowded most of the time, you will find that he is working for a per hour fee much less than you thought, or he had any idea of, for the dentists in Atlanta do not, as a rule, know what it costs them to do business or what their per hour rate should be and are putting in many hours of hard work for which they get nothing.

If your present income is not satisfactory, you may consider increasing same first, by increasing your fees. If this cannot be done without imperiling your practice, then second, by reducing your overhead expenses. In most cases this can be done. It is so easy to spend money recklessly in and on our offices that most of us go into it without giving it the consideration that we as business men should do. If we are able to pay the bills we are hurting no one but ourselves, but heavy expenditures should be considered very carefully. If you will pardon a personal reference, my own overhead has averaged thirty-two per cent. for the last five years. I think this is too high for me and am trying to get it down to thirty per cent. For ten years my overhead averaged twenty-five and one-quarter per cent., but it necessitated my doing a great many things personally that I am not doing now, and whenever you have assistants your overhead will be increased. Third, use every care and due diligence to increase the number of your income hours. Dr. Flagg's statement that a dentist will work more hours in his professional life by working only 1000 productive hours each year may be true, but men who do things are not constituted that way. The time to work is when the working is good, and it is well to strike when the iron is hot. We all know that it is not good judgment to tax our strength beyond the limit of our endurance, but there are comparatively few who will have to be cautioned along this line. Then, we must realize that the heaviest producing time in the life of a dentist is before he is 45 years of age, and he cannot expect to keep up the same stride after that time. While he may be able to do as much actual work as before, it will take more energy and he will be more exhausted at the end of the day.

When you have fixed an income-hour basis, use that in determining the proper fee for any operation. If you are not able to obtain the correct fee in each particular operation, it will have to be made up on some other operation for which you are able to increase your fee if you expect to come out on the right side at the end of the year.

ABILITY TO IMPRESS THE PUBLIC

The general public is being educated up to the necessity of having first-class dental service and it is going to be easier to render your services to them at the correct fee than it has been in the past, On account of improved financial conditions, people are able and willing to remunerate you more satisfactorily than in the past.

First impressions always are important and great care always should be taken that your operating room and your entire office be kept clean. Don't over-furnish it; some dental offices look like a photograph or picture gallery. It is not good taste to have any but simple furniture in the reception room, unless your financial condition is such that your patients know that you are able to have hand-carved Louis XVI furniture without making them pay for it. Above all things, keep yourself clean; you may think this superfluous, but it isn't. A clean face, clean collar, clean operating coat and clean hands are absolutely necessary if you reasonably expect to make a good impression on a new patient or to hold your present clientele. It always is advisable to have a clear, concise understanding regarding what you are going to do for a new patient. Later on your patients will have confidence in your ability and honesty, and it is not necessary to go into the minor details, unless they are out of the ordinary for that particular patient. Don't offer an opinion unless it is well founded, and don't attempt to obtain a patient on the basis of superior skill. You will not find it necessary to argue with a patient as to what ought or ought not to be done in the mouth. Your patients come to you on a basis of confidence—they do not happen in—and they are willing to abide by your judgment, as a rule, so that as long as you are true to yourself and true to your patients in dealing with them, you will have no trouble in selling your services to those who consult you, provided they can afford to pay your fees.

OFFICE ASSISTANTS

As soon as your practice or you can afford it, by all means obtain a young lady assistant. She adds a tone to your office that nothing else will, and she can make herself useful to you in so many ways. When my last assistant asked me her duties, I told her that she was supposed to do everything that I did not do myself. She is a great time saver, and will take all the little details off your hands. She prepares your inlay wax, cement and alloy, clears off your operating cabinet and bracket before you go to work, makes your charge tickets when the operations are completed, answers the phone and bell, keeps the linen clean at the chair, gets out your instruments, sends out your statements and keeps your books—and so many other things that you soon will find her invaluable. Great care should be exercised to obtain an assistant who will reflect credit on your office. I phoned one of our members some time ago regarding a young lady. He reported that she was one of the best assistants he ever had had, but that he had to let her go because he could not afford to have her in his office. The great trouble is that as soon as you have one trained to do your work as you desire it should be done she gets married—but this is a chance we all have to take.

RECORDS OF SERVICES AND PURCHASES

On the initial visit of a patient, only an examination of the mouth and a proper record should be made. The record is for future reference. Of course, emergency operations and relief from pain are exceptions. This also will give you time to ascertain the standing of the patient from a financial and a credit standpoint, which will guide you in making financial arrangements. This examination record is placed by your assistant on your cabinet or bracket when the patient comes for service, and you are not at a loss to know just the point of operation.

Charge blanks should be a replica of the examination blanks, so that as fillings are checked off on your examination blanks as completed, a charge can be made of the same by your assistant, with a minimum of chance for error. Always make a charge for every operation when it is performed, as it is clearer in your mind at that time than it will be later in the day, and it might be overlooked entirely. These charge blanks are listed in a combined operating and cash book each day, and from there posted to your individual ledger. Several years ago I adopted the combined operating and cash book as being the simplest means of keeping intelligent records. At the end of the month it is easy to know just what your operating has amounted to, what your collections have been, how much you have paid out—for what and chargeable to what, whether merchandise, expense or your own personal account. All of these will be posted to your general ledger from monthly footings, and not from day to day—thereby saving a great deal of work.

From years of experience in clerical work I believe the two best ledger records available are the card system and the loose-leaf ledger sheet, better known as the I. P. ledger sheet. I was not satisfied with the ruling of the I. P. sheet and am using a different ruling, which I have made 1000 at a time and use them in a ledger cover, with opening rings, with which you all are familiar.

The disadvantage of the card system is that it is necessary to remove the card from the case or file whenever an entry is to be made, and as these cards represent money and are liable to be misplaced or lost, it is a risky business, even though you are keeping your own books.

The disadvantage of the loose-leaf ledger sheet is that sometimes the rings will tear out the ledger sheet, but this, in my opinion, is the lesser evil.

I would advise anyone not to use any form of the old-fashioned bound-back ledgers, as the two systems I have mentioned are the only ones up to date. When the cards or sheets are "dead" they are transferred to a separate file or binder, and only live accounts are kept in your current system.

The plain professional "statement of services" as a statement head is the most desirable, but the account may be itemized if the patient wishes it, or for any reason it is best to do so. Personally, I do not care for the printed itemization of account, which is in use by some of the best practitioners, and when it is necessary to render an itemized statement, itemize only the services rendered, such as: 2 Gold Inlays, 1 Porcelain Crown, 2 Alloy Fillings, $32.50.

Statements invariably should reach your patients on the morning of the first day of each and every month, and let nothing interfere with their going out promptly. The later in the month you get them out the later and slower will be your collections.

PURCHASES

It is very desirable for you to keep a deposit account at one or more of the dental supply houses, on which you get a discount of a little over five per cent., so that if you turn over your money four times a year, you will be saving twenty per cent. on your purchases. This is good business and cannot be advocated too strongly. It is desirable, however, to be familiar with dental goods of different manufacturers, buy in quantities where you can use them and get the best price for cash. You always pay long prices for anything when you have it charged and buy it on long time. Keep a record of where you buy your materials or supplies, which are not purchased often, so that you can ascertain how much you use, in what quantities you can conservatively buy and what you have paid previously for them. When you get a quotation on a dental article or anything that you use, take a record of it and file it in your card index system, to be referred to when you next wish to purchase that article.

Be careful in your purchase of new instruments. Remember that new instruments and appliances are manufactured to sell and may or may not be satisfactory in your hands. You can go into dental offices and find hundreds and hundreds of dollars' worth of discarded instruments which the dentist at one time thought was what he wanted.

PAYING ACCOUNTS

Get away from the old-time check book and use the modern check register in paying accounts. For the register may be used a simple stiff-back blotter, which will last you from three to five years and is referred to much more easily than the check stub. *By all means deposit every cent of your collections in the bank and pay all your bills by check.* Keep a petty cash account of $25 out of which you may disburse small items and which is kept intact by drawing a check for what has been paid out and charging it to the correct accounts.

COLLECTIONS

The question of collections seems to be more or less of a bugbear to the dental surgeon. In order that we may make good collections it is first necessary that we should be careful in the extension of credit. There is an old saying that a piece of merchandise "well bought is half sold," and it is equally true that credit that is judiciously extended is half collected.

In the extension of credit one must be a reasonably good judge of human nature to know whom he can trust and whom he cannot. Of course, there are methods of finding out whether a new patient pays his bills or not, and if he has a poor rating the sooner you get the cash in advance or let him go to some other dentist, the better off you will be. There is no more reason why we should do dental operations in the mouths of patients who will not or cannot pay for them—unless it is a charity patient—than it is for one of our down-town department stores to sell a bill of goods knowing at the time that they were not going to get the money therefor. Then you will not have so many bad accounts on your books, and you will find that your collections are made with an ease of which you hardly had dreamed.

How are good collections maintained? First, by choosing your patients, and second, by being systematic in your collection of your accounts. In Atlanta, if a patient is commercially rated, you should have the information before you to intelligently decide what is the best character of work for that particular patient. Don't misunderstand me; it would be foolish to talk gold inlays or porcelain jacket crowns to a laborer making $12.50 per week, and equally foolish to let a wealthy patient off with a bill of $50 when he would be perfectly willing to pay $500 for a different class of work. If you think the bill would be heavy for any patient, always suggest that you give an estimate, though he may not request it, and that will lead to the discussion and the fixing of the method and time of payment.

If payments are to be extended for any length of time, always close the account into notes, as you can use the notes in bank if you desire; and then, a man will pay a note when he will overlook an open account.

In cases of patients who have no credit standing or any basis for credit, a substantial deposit is necessary when the work is started, and subsequent payments can be requested as it progresses. You may take a chance on a few dollars, but don't hesitate to ask patients for money when their credit is not established. If necessary, lose the patient and let some other fellow lose the money, for the patient will find some gullible dentist who will grab at the job, just as a channel-bass grabs at a bait, and the dentist will be hooked as firmly as the bass.

As a rule patients do not settle their professional obligations as promptly as those of a commercial nature, but when statements have been sent on the first of two succeeding months and you have no response, the account should have attention. It might be well to turn the account over to a collector, but experience along this line is generally unsatisfactory, though we are compelled to make use of them. However, it is about as much annoyance to keep behind a collector as it is the delinquent debtor. Your collector will be put off from time to time, and when this is done, you must take the matter in hand personally. One of our troubles is that we are afraid to ask a debtor for money—afraid that we will offend them and that they will leave us and go to some other dentist. Let me say that the debtor who becomes offended when courteously asked for the payment of an account of any nature that is past due is one you don't want on your books, and the sooner that you realize that you must look out for yourself along this line the better off you will be.

An account that cannot be paid within what you consider a reasonable time—say sixty days—should be closed into a note, or some definite time of payment agreed upon and the debtor should be impressed with the fact that when you have given him the best service of which you are capable you are entitled to your fee. You will find that the longer an account stands the harder it will be to collect.

The time was when an account for professional services was never placed in suit, but, gentlemen, that time has passed. When a debtor won't pay you, he should be made to pay if he is able to do so, and while you may make an enemy of him, his business and the business of his friends is a class for which you are not seeking. He will not go to you for further work to be done on a cash basis, but will pay his cash to another dentist, or take his chances on beating him as he has done you. You certainly owe it to yourself, the patient and your brother dentist to make every effort to enforce collections if the money can be made.

In this way your losses should be kept down to from two and one-half to three per cent., which would be a good showing in any ordinary commercial line. Prompt payments make good friends, and if I can impress on the members of this society the importance of close collections, I will feel that the hour has been well spent.

THE FUTURE

If you practice your profession along business lines, you will have some funds from time to time for investment.

The most important investment of any dentist who is permanently located is in a home and family, and if you are not so fortunate as to be married now, look forward to the time when you will be and can provide the comforts of home. A home tends to make better citizens and gives you a feeling of responsibility that nothing else can give. When this is done, you can invest your savings. First, in a savings account until there is enough to put into real estate or staple securities. Make a confidant of your banker and don't hesitate to consult him along business lines, for he is just as anxious to help you make money as you are to make it, and he always will give you conservative advice. When you invest in real estate, get the opinion of men who are in a position to advise, until you are able to risk your own judgment, and always consider well all sides before taking any action. Don't buy anything unless you can see your way clear to pay for it. Don't try to get rich quickly. Don't speculate in stocks or any commodity on margins—you cannot beat the game and the odds are all against you. If you *will* speculate, be prepared to lose, for lose you finally will, and then take your losses like a man. The big fellows make their money on the Board out of suckers—don't contribute to their already large pile and place yourself in the class of unfortunates.

By means of the conservative practice of your profession, and conservative investments, you will be able to take life easy when your investments will bring an income of say $5000 per year. It will only take $100,000 to $150,000 to do this, and while the goal will not be attained by all, we never can attain that for which we do not aim.

Start out tonight with this in view, look to the future when you will not be able to work, and determine that when you must lay down the hand-piece and the mallet, you will be able to do so, with the full knowledge of a life well spent and have no fears for the remaining years of your life.

(Credit given to "Profitable Practice" (Clapp) for many suggestions and quotations)

WORK FOR WAR-MAIMED MEN.

BY C. A. STARR, WEST SIDE Y. M. C. A.

Many thousands of men maimed in the battle for democracy will be trained back to usefulness and given a trade in a technical school just acquired by the West Side Y. M. C. A., 318 West Fifty-seventh Street. The announcement is made today that this institution has taken over the Dental Laboratories, Inc., at 25 West Forty-fifth Street, a school for mechanical dentistry. As this is bench work chiefly, men who come back minus a leg or otherwise maimed, so that they have two hands with which to work, will be able to learn this trade, where only a nimble brain and fingers are necessary.

The school was started three and one-half years ago by George and Nicholas Bonsignore, young Italians with a vision and ambition, but, unfortunately, with but limited capital. The school grew until they could not handle it without financial reorganization, for which the time seemed unpropitious. Therefore they came to the Y. M. C. A., which has several technical schools, and the deal has been consummated within the past few days which put the Red Triangle over the door of this additional school. The Bonsignore brothers will remain in charge of the teaching, with E. C. Babcock, of the West Side staff in charge of the business end. Mr. Babcock was at one time private secretary for John Wanamaker and has been a successful advertising man.

There was a time when the dentist did all of his own mechanical work, including the making of plates; now he farms the mechanical part out and confines his practice to the mouth work, sending the plaster moulds to a shop which is patronized by many other dentists. In some cities one shop will do the work of all the dentists. This school has but one rival in this city. It can accommodate 150 students at a time for 600 hours of actual laboratory work, beginning with the crude rubber working and including work in cement, plaster, silver and gold. It does not require a college education, but does require deftness with small tools. For this reason it is particularly suitable to reconstructed fighting men who are left both hands.

E. L. Wertheim, educational director, said that the new school was a natural addition to the technical department, formerly comprising automobile, airplane mechanics, printing and motion-picture machine, and that the strong incentive in acquiring it was to be ready for the men already being sent back to this country to be patched up and started over in civic life. He thought the increased interest in the care of the teeth through the propaganda of the board of education means a rapid expansion of dentistry and therefore a need for mechanical dentists. Mr. Wertheim's department in the year drawing to a close will have a total of about 6,000 students, more than half in the technical schools. In these schools the work is practical, the students being put to work doing the things they must master, finding all the problems and being taught the solution by specialists, with small classes and individualized instruction. The plan will be followed in the latest school acquired.

TO HOLD A FRACTURED JAW FOR IMPRESSION AND ADJUSTMENT

In all articles on fracture of the jaw, I never have seen, what seems to me, to be the most accurate way of taking a successful impression. If you make rather loose-fitting bands of regulating strip about 36 gauge or Liberty (nee German) silver 38 to 40 gauge to cover two teeth on each side of the fracture, solder each pair firmly together and then accurately align the edges of the teeth at fracture with the bands slipped on, and then hold the two sections of bands in line with sticky wax, remove, solder them together, and cement into place for a permanent splint. This will allow you to take an impression or do any other work necessary, without pain to the patient and with greater assurance of success than by sawing the model and trying to adjust fragments.

"THE LORD IS MY SHEPHERD, I SHALL NOT WANT"*

BY RABBI W. H. FINESHRIBER, MEMPHIS, TENN.

In introducing the speaker the toastmaster said:

"Abou Ben Adhem (may his tribe increase),
Awoke one night from a deep dream of peace
And saw within the moonlight in the room,
Making it rich and like a lily in bloom,
An angel writing in a book of gold.
Exceeding peace had made Ben Adhem bold,
And to the presence in the room he said:
'What writest thou?' The vision raised its head,
And with a look made of all sweet accord
Answered: 'The names of those who love the Lord.'
'And is mine one?' said Abou. 'Nay, not so,'
Replied the angel. Abou spoke more low
But cheerly still, and said: 'I pray thee, then,
Write me as one that loves his fellowmen.'
The angel wrote and vanished. The next night
It came again with a great wakening light,
And showed the names whom love of God had blest,
And lo, Ben Adhem's name led all the rest."

Mr. Toastmaster, Ladies and Gentlemen:

I HAVE MEDITATED on the psychology of after-dinner speaking, and as the result of meditation I have come to the conclusion that this is one of the barbaric customs we have inherited from our forebears, those who lived in the caves, for if you will consider a moment seriously what a peculiar institution this is—here are hundreds of you seated at the table eating the delicious viands set before you, and here at the speaker's table are five condemned men, waiting their turn in order to get rid of the speech that is within them, hoping and praying that the courses may be short and that they soon may be enabled to get the virus out of their system.

I am reminded of that very famous old Episcopalian bishop who, in his old age, had lost the desire to make himself heard among his fellow men, and now no longer enjoyed that strange thrill of power that comes to the man who stands in the pulpit and sways the minds and souls of his fellow men. And one day he was feeling very poorly, so he said to his body-servant—this was in the days before the slaves were set free—he said, "Pompey, I don't propose to speak this morning at the church. I wish you would go to the church door and nail this placard upon it." That placard read, "The bishop will not preach this morning, he is ill." And Pompey, his servitor replied, "Now, bishop, you know you can preach this morning. Just go there and try and I bet you will preach the best sermon you ever preached." And the old bishop shook his head and said, "No, Pompey, I cannot do it;

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*Address, Golden Jubilee Banquet, Tennessee State Dental Society, 1917.

I do not feel right. The spirit of the Lord is not on me today." But Pompey knew his master better than his master did, and he urged until finally the old bishop ascended the pulpit and preached the sermon of the day. It was a very successful sermon, and when he came back, tired and perspiring, the old servitor came to him and said: "Bishop, didn't I done told you? I knowed you would feel better the moment you got that sermon out of your system." And with some hope of that kind I deliver myself of my sermon tonight to you.

I am glad to have the privilege of welcoming you here this evening, and I felicitate you upon the fact that the association of the state of Tennessee has celebrated its golden anniversary. A very small and brief phrase, "A Golden Anniversary." But what a tremendous amount of experience and trials, of joys and sorrows, there are compacted within that. They were made concrete by that venerable old gentleman who stood before you a moment ago, and told you in eloquent and moving language what it has meant to him and his contemporaries to found within this great state of ours an association that has done so much for the health and progress and development of the citizens within the state. I wish I could persuade those of you who do not live here to remain; not only to stay the few short days that have brought you here to celebrate this golden anniversary, but to throw open wide our hospitable doors and say to you, "Remain."

That reminds me of a story told by a gentleman who once went to the city of London. He was walking down one of the great thoroughfares of that tremendous city and he saw upon one of the corners a lovely young woman belonging to the Salvation Army, standing there and distributing tracts. A bashful young man came along the street and as he came up to the Salvation Army lassie, she handed him a tract that she was giving to the people that passed by. He took the tract, looked at it, and as he read the title of it his face became suffused with blushes, and he stammered and shook his head and said, "Thank you, but I am married." The title of the tract was "Abide with Me." I wish I could persuade all of you to abide with us in this beautiful city of almost two hundred thousand inhabitants, with its remarkable growing university and dental college that is doing so much, and already has done so much, for the great development of mental and physical culture in our Southland.

Our toastmaster has given me a very comprehensive theme to talk upon tonight, and he gave it to me with the express injunction that I may be allowed to wander freely over all of the beautiful fields of thought and to gather what flowers or weeds I might—"The Lord is my Shepherd, I Shall Not Want."

This is the opening phrase of perhaps the most beautiful psalm in the old Bible. Perhaps the most inspired passage in our ancient and revered scriptures is that. It marks the very highest point of spiritual development. It undoubtedly was written by one of the great shepherd kings of the old Palestinian lands; perhaps David himself, who, as a shepherd boy in his youth, developed into a strong man, gathered the clans of Israel together and consolidated them into a community—into one great powerful nation. He knew sorrow, he knew pain, he knew disillusionment; he had his dreams in the days of his youth, and he was acquainted with grief, and doubtless in one of those moods of depression, when he thought there was no answer to the great soul-cry, when he thought there was no response to that tremendous utterance that wells from every human soul in the hour of depression, pain and sorrow, he called out in the very paroxysm of faith, "The Lord is my Shepherd, I shall not want; He leadeth me beside the still waters;" and reaching the very triumph of human feeling, he exclaimed: "Tho' I walk through the valley of the shadow of death, I shall fear no evil, for Thou art with me. Thy rod and Thy staff they comfort me."

When human beings can say that, they can say that they have known religion. When human beings, down in the deepest valley of human agony, can still say that "The Lord is our Shepherd, we shall not want," then they have known the significance of spiritual communion with the Maker.

What relation has that to this gathering, to you and to me, in this dread hour of our destiny? It seems to me that it spells a mighty lesson, for you are the servitors of the Most High God, for you, gentlemen of the dental profession, you have in your hand the making and marring of human life, for you stand at the very entrance of health, which spells success, power, prosperity. And more and more with the increasing years you are realizing the responsibility that is placed upon your shoulders by the social organism of today.

Some fifty years ago, as the eloquent old gentleman who preceded me said, the dental profession was a mere by-product of the great medical profession. You were not then given the privilege of preparation; you were not then treated seriously; you had not yet gained full compass and power over the forces of nature and over the results of science. And now more and more there is being handed to you the golden key that unlocks the portals of human health and human strength. And for your real achievement and for your real growth and stature, there must be developed in you a tremendous power of faith that the men and women who come to you may have the same confidence that the old Davidic prophet had when he cried out, "The Lord is my Shepherd, I shall not want." You are to have the same strength in yourself, the same confidence in your power, and you then will inoculate those who come to you with equal power, with equal confidence in yourself.

But even above those things, the lesson this text of mine has for you and for me is in our relation to the struggle of today, the great war, the world cataclysm which is upon us. Never in human history have men been confronted with equal opportunity and equal power as they have today. The thews and sinews of men are being tried out; our hope in humanity, our confidence in world progress, our faith in things is being tested as it never was tested before. When men and women around about us on all sides are saying that the crack of doom has come, that the end of the world is near, that culture has fallen, that civilization has cracked at its very base, that there is no longer that fine old optimism and fine old dream of universal brotherhood, then it is yours to respond with me, as I respond to the toast tonight, "The Lord is my Shepherd, I shall not want. "The Lord is our shepherd; the world shall not want. The great pillars of society are not yet broken, though they may be cracked. Civilization is not destroyed, although there is a gnawing at the roots of it. The brotherhood of men is not a hollow phrase, even though it may be doubted by those who have lost faith in the essence and significance of those mighty words.

I am reminded of a very beautiful story told by one of the wise men of the Orient, one of the great saga-makers of those old Oriental peoples, who cannot compare in mechanical progress and civilization with the western world, but who had the grace and the gift of God within them and who had the ability, the intuitive power, to read beyond the events of the present and see the dawning of the future. He tells this story of the great King Solomom. You know something, perhaps, about that great old man. You know that in the Oriental literature, which perhaps is a closed book among us today, there was told the following fact: That he was a very wise man, that he was acquainted with the culture and the wisdom of all ages; he could speak all the languages of the seventy peoples who were supposed to have lived in those olden days. I do not know where he got his information and when he got his wisdom. I have my own theory about it, and that theory is based upon the fact that he had a thousand wives. And the inference to be drawn from that is that if we are wise and listen to the wisdom of the one wife God gives us, perhaps we might some day measure up, at least in part, to the wisdom Solomon had in his old age. He listened to his wives. He *had to* listen to his wives. And out of that source of wisdom he gathered not only the ordinary knowledge that the scientific men of that day and our day had and have, but he also knew something of those subtler things that come to the great men who, like mountain peaks, stud the pages of our history. He knew the language of the animals; he knew the meaning of the storms, and the sunset and the sunrise were an open book to him. But he also had something that the average student of those old days did not know; he possessed the saving grace of humor. He was the Mark Twain of his period, and he loved to jest and tell stories. And he had a very fine old gentleman who was the chief of his bodyguard, an old retired general, and his name was Benaiah. Benaiah was, like all soldiers, a man with no sense of humor. He was too busy killing people to understand the significance of human life. And Solomon loved to jest with him. One day he said: "Benaiah, I am going to give a banquet, and I want a great surprise at that banquet among many surprises I will have on that day. I want you to go out and get a golden ring, and the magic in that golden ring is that whosoever possesses it, by virtue of that possession will be rendered everlastingly happy." Benaiah bowed and said, "Your majesty, your word is law. I go to seek the magic ring of happiness." And Solomon smiled, for he knew there was no such ring.

Benaiah went out into the byways and highways around Jerusalem and asked the people, "Have you seen the golden ring?" and they shook their heads and said, "No, we haven't even heard the whisper thereof." He went to the jewelry stores and he said, "Do you know anything like this golden ring that bestows happiness upon the possessor thereof?" And the day drew nigh when the banquet was to be celebrated, and Benaiah had no golden ring. The morning of the banquet, in desperation he went into one of the alleys of the great city of Jerusalem, and to his surprise he saw a little jewelry store that he and his emissaries had overlooked. He saw a young man standing in the store, and he said, "Young man, perhaps you have a golden ring that has the peculiar virtue that the possessor thereof has everlasting happiness." The young man shook his head sadly and said, "No, I haven't it, nor have I heard of it." But in the rear of the store there was an old white-bearded sage and he heard the request, and he rose to his feet and stumblingly he walked forward, and he said, "General, did I understand you to ask for a golden ring?" And the general said, "Yes, sir, I am looking for a golden ring; perhaps you have it." And the old man said, "Wait a moment."

Then he went to the young man, and there was momentary whispering, and he went into the rear of the store and found an old box in which there was a lot of old jewelry; and he delved into the depth of that box and finally picked out an old, worn golden circlet, and he handed it to Benaiah and said, "This is the ring."

And the general, with great joy, went to the banquet that night saying not a word to his master Solomon that he had found the ring. And after everybody had eaten and eloquent speeches had been made, Solomon arose and said: "Gentlemen," (for only gentlemen were admitted to the banquet at that time) "I have a surprise in store for you. I want to show you how faithful my servant Benaiah is. I asked him to go and find the golden ring. No one else ever has found it, but he has." And he expected Benaiah to blush with disappointment, but Benaiah arose and said, "Your majesty, here is the ring." Solomon looked at it, and he gazed at the inscription on the inside of it, and he blushed and said, "You have put me to shame. You have found the golden ring." And he raised the ring up and said, "In this ring there is the following inscription: The three Hebrew letters, 'gimmel,' which is equivalent to the English letter 'G,'' sounded hard; the letter 'zayin,' which is equivalent to the English letter 'Z;' and the Hebrew letter 'yod,' which is equivalent to the English letter 'Y.' And they form the first letters of three words, which are 'Gam Zeb Ya'avor,'' which being interpreted means, 'Even this shall pass.'" And Solomon turned to his friends at the banquet table and said, "Any man who has this ring, with this inscription on it, 'Even this shall pass,' knows the meaning of happiness, for it spells confidence in the Great God of our Fathers. It means that joy will pass; it means that sorrow will pass; it means that the cataclysm of our day will be no more."

So, friends, I say to you, Gan Zeb Ya'avor, even this terrible world war shall pass, and the day will come when you and I will have the ineffable joy of seeing that the great struggle is over; that the young men who marched out will come back to be enfolded in their mothers' and fathers' arms again; that a sorrowing humanity which now is bending its head with the shock and grief of seeing human flesh torn and crushed, of seeing its noble citadels turned into dust, of seeing beautiful cities and wonderful monuments turned under the plow, will rise again Phœnix-like until it shines like the everlasting day, and from the throats of humanity there shall come the cry, as came from Solomon's lips, "Even this shall pass," and the world will utter with you and me, "The Lord is my Shepherd, we shall not want."

Men who are proud of ability to show other men "Where they get off" are prone to forget to tell them "How to get on."

PRESIDENT'S ADDRESS.*

BY F. A. WILDASON, D.D.S., INDIANAPOLIS, IND.

CUSTOM HAS ORDAINED that the retiring president of this society shall deliver an address. While I have no desire to make a formal oration, I do feel that the time is right for a brief resume of dental progress made in the past year, and a somewhat cursory contemplation of progress which should be made in the coming year.

Since our last meeting, at Kokomo, there has been a marked increase in enthusiasm of the men in the dental profession in Indiana for their work. Better work has been done by them than in the past; their skill has become greater, their experience wider, their minds broader than ever before. The feeling between individual members of the profession has been kindlier and more friendly than for many years. There has been a freer interchange of ideas and a better understanding of one another than at any other time within the history of the profession.

All of these things have come about by members of the society becoming better acquainted with each other and with more prominent members of the profession in this and other states—through component, State and National Societies—by hearing the other fellow's ideas, by seeing his ideas carried out and finding them good by giving him ours and observing him place the stamp of approval on them; and by generally getting together and stimulating in one another the spirit of and desire for progress. The old saw has it that familiarity breeds contempt; but familiarity with a fellow practitioner's methods of procedure and habit of thought breeds increased professional enthusiasm and vigor, if those methods and habits are good.

Years ago this society began the development of the idea just expressed in an effort to raise the standard of dentistry. During these years it succeeded in bringing to members at its annual meeting, many men of state and national prominence in dental circles to address and give clinics to its members. These men brought to us the fruits of their best endeavors in their chosen lines of work, and with it they brought enthusiasm and professional energy. Some of that enthusiasm we imbibed. As a direct result, The Northern Indiana Dental Society began each succeeding year with renewed vigor and heightened aspirations. So well has this plan succeeded that not only are we in better trim to appreciate the good things that may be brought before us professionally in the future, but we have learned something of how to keep in such trim, and how to develop and present our own methods and ideas that they may be of the greatest value not only to ourselves but to our dental brethren.

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*Address before the Northern Indiana Dental Society, September, 1917.

The future of this society rests absolutely upon the liking of its members for, and their desire and willingness to do, earnest, conscientious, scientific work. It counts among its members men who, out of their long years of experience, have become authority upon diagnostics, symptomology and treatment as applied to medicine from a dental view. It possesses skilled oral surgeons who are doing much good work and as good work as is done in the whole country. It has expert radiographers, orthodontists, exodontists, prosthetists, and practitioners of the other leading specialties of dentistry.

With this armamentarium The Northern Indiana Dental Society should be and is one of the best societies in the country not barring state societies. It was a better society in 1915-16 than the preceding year; it must and will be a far better society next year than it has this. Its watchword should be, "Progress," and its ideal "The best there is in dental science."

This paper would not be complete—touching, as it does, the future as well as it does the present and past, without a brief resume of some things the dentists of this and every community need as viewed from a dental standpoint.

We hear the cry go up every day, "Educate the Public." Many suggestions and methods are offered; however, a proven method has not yet been brought forward. How are we to educate the public without the dentists first being educated? When the dentist studies the practical needs of the public, instead of the latest model of automobiles, then, and then only, will the public be "educated". Failure on the part of the colleges to give the proper training along these lines, a self-satisfied state of mind when we receive our diplomas, and a lack of conception is largely, if not entirely, responsible for the present state of affairs.

The dental profession has been making forward strides. In recognition of its ability, and the important relation it bears to health and comfort, the government in the past year appointed an Army and Navy Dental corps. There is a bill pending which, if passed, will give dentists in the Army and Navy the same corresponding grades as in the medical corps,* also that the examining board shall be composed of one officer of the medical corps and two of the dental corps. This proposed legislation automatically will give the grades of the dental reserve corps, First Lieutenant, Captain, and Major, also all enlisted men and officers at expiration of term limit, or having received injuries while in active service shall receive pensions according to their rank.

In conclusion I would like to make a few suggestions: I would like to see a consulting dental surgeon on every public and private hospital staff. The reason we are not recognized is because we haven't proven our worth. There are many things which we do not have which we must secure, if the dental profession is to be made what is already within her grasp, if she will only work a little harder, a little more earnestly, and with a little more foresight.

A representative of the dental profession should be recognized on the State Board of Health. Every school should have a dental inspector and a free clinic maintained by taxation, taken from the general fund. Every state institution should have a very thorough and competent dentist to care for the dental needs of its inmates. When the work in one institution would not occupy his entire time he could be assigned to more. A consulting dentist should be on the staff of every first-class sanitarium.

Last, but not least, we need a better acquaintanceship with one another; a better idea of what the other fellow is doing and how he is doing it; a kinder appreciation of his viewpoint, his needs, his aspirations and ideas, and a better understanding. The more we know of these things the better we ourselves become, the better fitted we are to do good work and more likely to attain to that high mark which should be and is the aim of each of us professionally.

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I wish to thank the members of the various committees for their hearty co-operation and faithful endeavor to make this meeting of The Northern Indiana Dental Society a success. Especially I wish to thank Dr. Nixon and dentists of Valparaiso and vicinity for the splendid entertainment provided for the visiting dentists and attending ladies. I would regret very much to hear of one dentist saying he had not received any benefit or pleasure from this meeting. There is always very strenuous work in preparing a program, advertising, getting accommodations, etc. These men have worked hard and faithfully and you can show your appreciation in no better way than to be on hand when the time comes for the clinics to begin. The better attention you give the more you will get out of this meeting.

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*Passed May 20, 1918.

WHAT SHOULD BE TAUGHT IN THE DENTAL COLLEGES.*

BY A. F. DANIAL, D.D.S., ROME, GA.

VIEWING THE DENTIST as a finished product. he should feel that he is and should be the equal of the most potent factor in his community. In civic pride, in moral influence, and in good will for the well-being of his community, he should have no superior. He should love his fellowman, he should love and praise the citizenship of his community; and best of all, he should love children and make this love manifest; he should love flowers, specimens of art; should cherish high ideals, and strive to attain them.

To possess these qualifications, he must be prepared. He must meet the Creator in the garden of nature, he must be able to appreciate the wisdom and beauty of nature by communing with the flowers; he must enjoy the songs of the birds; he must know something of logic and psychology. He must meet the battles of life alone; must fight his battles alone. No forces in his realm to ally with him; he must fight within his own entrenchment, armored with love for the Creator and faith in the Divine guidance of the destinies of man.

It is with the Dental Colleges of our land to make the personnel of our profession what we may desire it to be. I am glad to note that the National Association of Dental Faculties has raised the standard of qualification for matriculation in our colleges. This is a shot at the "bullseye." I am glad to learn that our Georgia colleges reached such a high standard of work this year that the Georgia Board of Examiners could pass every one of their graduates. This is approaching the ideal standard. I believe we should commend our colleges for this achievement; co-operate with them and bid them press onward and upward. It is largely with our colleges to purge the dental profession of its impurities, and raise it to a high standard of recognition among our kindred professions.

It was my purpose to mention a few things that I think the Dental Colleges should teach. My deduction from eight years' practice is, that mere training in dentistry alone is inadequate to equip the dentist to meet and solve all the problems with which he comes in contact. I will concede that a great many of our pioneer dentists have made good from having no more than training in dentistry, but from the day of their graduation they have been arduous students of all the kindred sciences. I grant that many of our dentists have attracted a large and choice clientele, and have made money just practicing dentistry; but let me say that I consider getting money one of the most perishable parts of success. Why not give the student a full equipment to begin and our colleges the honor for the achievement?

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* Read before the Georgia State Dental Society, 1917.

This is the age of specialism and of many specialties. I don't believe the college should spend much of the students' time in detailed and practical chemistry. Chemistry is a specialty, and the dentist only needs the general principles.

I don't believe much time should be spent in studying metallurgy. Leave the details for the manufacturing metallurgist. Chemistry and metallurgy are not developing branches of education. They are just tables, processes and formulæ that tax your memory and are soon forgotten unless you specialize in those branches.

I will suggest that the time gained here be applied to the study of medicine, and one year in medicine be added to our course. Further, the dentist should be a master of the principles of dietetics. He should know the principles and processes of digestion as thoroughly as the physician. He should be able to prescribe as intelligent a treatment for any stage of indigestion as any physician. He should know all that is knowable in diagnostics. These things are right up to your job, and when you call your neighbor physician who is out of town, you begin to feel yourself a negative factor. Many cases of toothache, many abscesses, many cases of neuralgia, and inflamed and spongy gums, are partly caused primarily by indigestion, depleted circulation, and malnutrition. The dentist should be able to treat intelligently any of these conditions without assistance: and without a systemic treatment you cannot get the desired results from local treatment, and you run a grave risk of losing the confidence of your patient. Suffering humanity today is seeking the services of the doctor who can produce the desired results.

The dentist should be specially trained in the care and treatment of expectant mothers. Nowhere is a better opportunity offered a dentist, and certainly are his services never more valuable than in the care and treatment of an intelligent and appreciative expectant mother. If he have the proper training, he is better prepared to care for a patient during gestation than the physician.

Permit me to say again that I believe dentists would be stronger professionally, and more independent in their sphere, if they had a broader vision of the principles and practice of medicine.

I wish to commend the University standard of medicine, pharmacy and dental teaching. My opinion is that it would be much better for our professions if all of our schools of medicine, pharmacy and dentistry were departments of universities.

Humanity deserves the highest standard of professional service, and the civilized world today is seeking individuals who can do things.

FOCAL INFECTION*

BY THOMAS H. KELLY, M.D., CHICAGO, ILL.

I DESIRE TO EXTEND my appreciation of the honor of addresing you and especially on the topic of "Focal Infection."

Probably no single development in medicine during the past five years has exercised a greater influence on our conception of the pathology and treatment of disease than the principle of focal infection. It may be stated thus—that the body generally or metastatically, can be subjected to grave disease, acute or chronic, through dissemination from a small, pent-up, circumscribed area of pathologic tissue that in many cases eludes discovery after a careful scrutiny. The most notable work in establishing and confirming this mode of pathogenesis has been done by Shotmuller and a group of workers under the leadership of Billings and Rosenau.

The most common seats of primary foci center about the oral and nasal cavities. Chronic latent infections occur about the circumference and roots of teeth and are known respectively, as pyorrhea alveolaris and alveolar abscesses. Dental operations in which filling of the various root canals has been imperfectly accomplished are a fertile source of focal infection. The portion of nerve left behind in the root canal, which authorities admit never can be totally sterilized, decomposes and becomes the starting point of an infection which centers around the root ends. The products of infection are held under tension in each circumscribed area and as the filling of the canal leaves no exit externally, the products are forced into the blood and lymph stream. The absorption may be sudden and in large amounts, or it may be slow, a small degree taking place more or less all the time. The bacteria, owing to various factors, may undergo alteration in degree of virulence, or even in type, whilst resident in foci, as seems conclusive from the brilliant experimentation with the streptococcus-pneumococcus type of bacteria as carried out by Rosenau. Besides the teeth, the faucial and nasopharyngeal tonsils and the mastoid, maxillary and accessory sinuses may be the seat of foci. In children the tonsilar tissue is more prone to be the cause of infection than the teeth. The abdomen not unfrequently holds circumscribed areas of infection in the gall-bladder, appendix, uterus, fallopian tubes, seminal vesicles, prostate gland and ureter. Metastatic dissemination has often been observed to follow infection beneath the toe- and finger-nail. Authorities also report cases seemingly originating from cases of bronchiecstasis.

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*Read before the Northern Indiana Dental Society, September, 1917.

From what has been said it is quite obvious that foci of infection or circumscribed areas of pathogenic tissue may be located in innumerable places. Often several such areas are simultaneously present, a fact which should be borne in mind in instituting treatment for the purpose of extirpating these disease-spreading foci. Most infection is located about the teeth or lymphatic tissue of the head and neck, the teeth especially being found more often at fault in adults than in children.

As has been stated, the foci consists of an area of pathogenic tissue containing bacteria, ferments, exudate and detritus of destruction. Owing to either increased pressure of the contents, lowered bodily resistance, local or general, or injury, dissemination of either bacteria or their toxins or both take place periodically or constantly in a mild degree.

Preceding the spreading, a change in the virulence type or special pathogenic properties of the germs may occur. That this change or transmutation may and does occur has been demonstrated by the epoch-making work of Rosenau.

Cultures of the streptococcus viridans are taken and subjected to different degrees of oxygen tension, to growth on various hypo- and hypertonic media, and to animal passage. By this method the steptococcus viridans can be transformed into a typical pneumococcus as shown by cultural characteristics, biological reactions and the specific lesions produced in animals. Streptococcus hemolyticus and streptococcus mucoccus are other definite types produced from the streptococcus viridans. Rosenau has isolated different strains of streptococci which has exhibited special affinities for different tissues of the body. One type when injected into rabbits produced uniformly an arthritis, another a myositis, another endocarditia. In fact, streptococci have been differentiated to such an extent that they produce with almost uniform regularity respectively arthritis, endocarditis, nephritis, chorea, appendicitis, cholecystitis, myocarditis and erythema nodosum.

Somewhat of a revolution has taken place in our ideas as to the etiology of peptic ulcers. It is now beyond doubt that in most cases these ulcers are produced by a metastatic infection in the stomach mucosa by a certain strain of streptococci. The fact that this condition makes its appearance so often after an attack of tonsilitis or la grippe and occurs at certain times of the year, the spring and fall, when such conditions are most prevalent, lends color to this theory. Rosenau with one of his strains of streptococci produces regularly peptic ulcers in animals which may be traced within forty-eight hours after injection.

While great stress has been laid upon the streptococci, these are not the only germs found in focal inflammations that cause trouble in other parts of the body. The staphylococci, tubercle bacilli, colon bacilli and gonococcus play no small part in the maintenance and dissemination of disease in the body system.

As may be judged from the foregoing, such affections occurring in the human as rheumatism, endocarditis, myositis, nephritis, in many cases appendicitis, are properly to be traced to invasion from a focus of infection in the tonsils, teeth, or other regions of the body. If we question carefully with, for instance, rheumatism, we shall be surprised to find how often there is a history of tonsilitis having occurred in the previous week or ten days.

Chronic infections pursuing a slow-going course with exacerbations are also attributed in many cases to focal infection. Of this class chronic nephritis, chronic arthritis and arthritis deformans are of special importance.

Adequate scientific treatment at the present time requires that we institute a painstaking investigation to discover foci of latent infection. Following the first enunciation of the character of focal infection and the recommendation that diseased or suspiciously-diseased tonsils, teeth and so forth be removed, these procedures were undertaken with a wave of enthusiasm. It was believed that such pathological entities as arthritis deformans would summarily clear up. When this did not take place a tide of reaction set in. The words of Dr. Billings and other original workers in this field should have been heeded. They cautioned that a focus found to be present might be only one of several, each contributing its part to the general systemic infection. In many cases only improvement and not cure could be hoped for in this treatment.

The failure of immediate striking results led to more or less doubt as to diseased teeth and tonsils having any relation to systemic disease. However, a conservative estimate of the evidence at hand justifies us in adopting a policy of eradication of foci of infection that may be detected after scrutiny of the tonsilar ring, sinuses, teeth and other parts of the body. It should be remembered that innocent-looking tonsils may at times harbor latent abscesses. Buried and incompletely-removed tonsils covered by scar tissue are a particular source of danger. The importance of hidden alveolar abscesses has reached such an understanding that roentgenograms of the whole teeth ring are easily procured. Teeth showing infection should be removed, or treated properly. If this has no influence on the chronic condition at hand, it may serve as a prophylatic measure against future ill health.

Much may be done in the preventive field. The public should be educated to have dental defects corrected in their incipiency. The dangers of Rigg's disease should be spread broadcast. Our dental schools should emphasize the hazards arising from prematurely or improperly filling the root canals.

In our own profession the dangers of mere tonsilotomy versus tonsilectomy should be borne in mind, the former procedure allowing scar tissue to cover and bind down areas of infection in the remnant tissue. In genito-urinary infections, treatment should be so conducted that the infection is obliterated from every crook and crevice of this tract. Chronic, smouldering foci in the appendix, gall-bladder or other abdominal organs should be surgically treated. Vaccine therapy can be employed in selected cases.

For the diagnosis and treatment of focal infection and its systemic effects, the great value will be readily obvious of an arrangement whereby a patient is examined in turn by representatives of the various specialties, including the X-ray, who work in unison. Findings are compared and correlated. Such a system is followed at the Kelly Clinic with splendid results I have considered this plan so ideal for attacking latent chronic and complex diseased conditions that I have instituted an organization consisting of internists, surgeons, eye, ear, nose and throat specialists, roentgenologists, dentists and pathologists. These work together under one roof and under my general supervision with very satisfactory results.

ABSTRACT OF DISCUSSION

C. O. Wiltfong, M. D., Chesterton, Ind.: The excellent paper just presented by Dr. Kelly is one of utmost importance at the present time and opens up an extensive field for discussion. The principle of the development of a systemic or localized disease from a previously existing infectious focus is a long established fact.

Rheumatic fever, endocarditis, generalized tuberculosis, gonorrheal arthritis and septicopyemia, are familiar examples. Not only acute but chronic systemic disease, such as Cardio-vascular and visceral degenerations may be caused by chronic focal infection. The focus, acute or chronic, may occur anywhere in the body, but it must be almost admitted that by far the most of such foci are located in the head, probably because the mouth and air passages are so frequently exposed to infection. Bacteria-laden air, unsanitary dwellings, faulty individual mouth hygiene, etc., play an important part. In childhood the lymphoid tissue of the nose and throat may be excessive and apparently affords a favorable soil for infection. The faucial tonsil and adenoid over-growth in the naso-pharynx are the frequent seats of infection. Obstructed infected crypts of the tonsils, due to chronic tonsilitis, or to the sealing scar of tonsilotomy are the most common focal source of many systemic diseases.

No less a source of systemic disease are the teeth and gums. Placed as they are, in this constantly and abundantly-infected cavity, they are admirably situated as an entrance of infection.

There seem to be two principal modes of infection about the teeth, first, that around the gingival margin and second through the pulp chamber and root canal. The first, or gingival margin, giving rise to gingivitis first and by infection terminating in pyorrhea. This, I believe, can be prevented by proper care of the teeth and mouth, and would strongly urge the continuation of the campaign of the present-day dentists in the education of the public in proper hygiene of the mouth and teeth. If our school inspection was more generally in use, and the children taught the advantages of proper methods of care of the teeth, they would take their knowledge back into the home with wonderful results in the field of preventive medicine. The dentist and physician should lose no opportunity along these lines.

The second, or the pulp chamber and root canal. Apical abscesses originate usually at the apices of dead teeth from infection of the root canal, which is not entirely filled or from putrefying pulp which has not been entirely removed. The prophylactic here lies with the dentist in using aseptic measures in the preparation of root canals and the development of a more perfect method of filling them.

I must not fail to state, even while facing a body of dentists, that modern denistry has technical faults. The use of metal crowns upon teeth with infected pulp, or with partly filled root canals, in many instances results in the establishment of mechanical work done over infectious foci, later producing apical and alveolar abscesses. While I do not wish to be understood as favoring the wholesale slaughter of teeth by extraction, in my opinion the general use of crowns and other such dental measures, which are likely to shut in infectious foci, should be abandoned. What the remedies for these procedures will be must remain for you members of the dental profession to work out, but there is no reason to believe that you will not be able to accomplish these things. To offset the great harm that is being done by infectious mouth foci your methods of practice doubtless will have to be changed. Dentists have tremendous problems before them which will take the wisest and best among them to solve. The dental profession must recognize that these foci are a menace to health. The more I study these conditions the more I am convinced that more teeth must be extracted.

Dr. G. L. Smith, Hammond, Indiana: I do not know why I was made the goat of this society, being the only member of it to discuss Dr. Kelly's paper, but I, being the goat, suspect I will have to make the best of it.

I can assure you that I am going to make myself more liable to discussion than Dr. Kelly has. If I could write a paper that you could not criticise any more than I can his paper, I would be very proud of myself.

So much has been said, written and published on focal infections that it does seem most of us should be more or less familiar with the subject. And yet, we occasionally hear a physician or a dentist ridicule the idea of treating systemic diseases by simply making the mouth sanitary.

The source of most chronic diseases is undoubtedly the mouth, beginning in pyorrhea pockets, apical abscesses or in necrotic conditions in the alveolus. The tonsis are also a great source of infection, but I believe are a secondary infection from the mouth. Pyorrhea pockets can be and are successfully made free of infection and can be kept so.

Apical abscesses are something I am not sure about. Dr. Frederick B. Moorehead says that "not ten per cent. of the dentists are competent to undertake difficult root-canal work." And the more I read X-ray films, the more I think he is right. The X-ray does not by any means show all the infected areas. I cannot agree with the essayist however, that there is always a part of the live dental pulp left in the root canal that cannot be sterilized, and is left to decompose. I agree that this very frequently is done, but not always. Personally I do not see if the Callahan method is followed with careful ionization how you can have any live pulp tissue left in the root to decompose.

Doctor Karl Knoche, however, reports the finding of as many as eight diverging canals from one root. That does not look very encouraging to us who are trying to save dead teeth. This much we do know, because it has been proven conclusively, the greater number of dead teeth are sources of infection, and we do not know that all are not. So if we undertake to save dead teeth we should at least leave nothing undone to make them as sanitary as possible.

Now, just a word for necrotic conditions left in the alveolar process. Many abscessed teeth with infected necrotic areas are extracted and left to correct themselves. This they will not do. But the gum will close up over those infected parts and seal the infection there to be diverted into the blood stream. In this connection, I would like to say if I decide to extract for the effect it will have on any systemic disorder, I remove all the infection from around the teeth first and put the free margin of the gum in a healthy condition, and then never extract more than one or at most two teeth at a time, and thoroughly curette and irrigate until I feel that it is perfectly healthy before I allow the socket to close up. In following this procedure you will get the systemic effect quickly, (provided it is from the teeth).

I would like to report some cases that I have had the opportunity of watching. The oculist with whom I office, has had three cases of inflammation of the cornea where he did not use a drop of medicine, but upon the removal of the adenoids and tonsils each of the three cases got well.

I would like to report another case of chronic iritis which had occurred every fall for eleven consecutive years. In October, 1912, vaccines were used for temporary relief. The patient was turned over to me and I did considerable work in the mouth. He had no further trouble until October, 1914, when some more work in the mouth was done and he has had no re-occurrence to the present.

Another case that was brought to my attention was that of a girl who had episcleritis. A small cystic mass resembling a boil at ⅜ of an inch from the templar side of the cornea of the left eye. It was first noticed on Dec. 25th, 1915. On Jan. 27th she consulted an optician. At that time it was badly swollen. I was asked to look at the case on Jan. 31st, and advised the extraction of several roots and the opening up of an abscessed tooth on the left side of the face. (I might add they were all on the left side of the face.) This was done on February 1st, and on the 9th the cyst began to disappear and was entirely gone Feb. 14th. This condition, I am informed, usually takes from two to three months to clear up.

I can report a case of gall-stone cholic, the patient, a lady, having been advised by two physicians that an operation was necessary. In the mouth were found two badly-suppurated roots. These were removed and upon clearing the mouth of pyorrhea, she has not had an attack since March.

Just a few words further. During my vacation this summer, I was up the lake and a young lady was troubled very much with severe pains in her left eye; she had been going to an oculist and he insisted there was nothing wrong with her eye but she had this trouble every little while. I was the only thing that looked like relief and she called me in and asked me what I could do for her. We had an X-ray taken of her mouth, and found an abscess over the left upper cuspid. We had her dentist remove root filling and in 24 hours her eye was comfortable and in 36 hours it was not sore when you pressed it with the finger, and she said at no time in eight months had it been free from soreness from pressure.

Dr. Earl Brooks, Noblesville, Ind: Dr. Kelly made one statement that I do not think I quite agree with, and that is that the majority of children receive most infection from the tonsils. That may seem true to him, but if he should examine as many children's mouths as we dentists he would probably think that the majority come from the teeth. I believe that the teeth are responsible for more focal infection than the tonsils. I always say that 75% of all focal infections originate in the head, and 75% of those originate in the teeth. These are just a few figures that I always have used after having followed the subject in the literature and by observation in my own practice.

Some one in the research department has figured out the possible ulcerating surface in the mouth of a pyorrhea patient, which always has appealed to me as rather interesting. We have 32 teeth, and measuring the circumference of each at the gingival and adding together, we would have approximately 32 inches linear. Supposing that we have pockets and ulcerating surfaces of an average depth of ⅛ inch. We would then have an ulcerating surface of four square inches in the mouth. That much of an ulcerating surface any place else in the body would be terrible, and would need immediate attention. I do not think that either the dental or medical profession have awakened to the fact of such a vast ulcerating area as that ever being in the mouth, yet it is true.

Focal infection lurks where we least suspect it. I recently had my two daughters operated on for the removal of tonsils and adenoids, the oldest daughter, we thought, never had had any trouble with her tonsils or adenoids, and was in perfect health. She had had just one [illegible] tonsilitis so as a matter of precaution I took her to the specialist and he said "O, yes, she had better be operated on." I thought it was a specialist's game but in the operating room her tonsils proved worse than those of the other daughter. When the tonsil was touched it burst open and pus ran down her throat.

I think that we have focal infection many times where we least suspect it in the teeth as well as in such cases as the one just related.

The doctor who last discussed the paper, in regard to removing necrotic tissue—I do not think that it is ever good practice to extract a tooth where there is necrotic tissue without also removing the necrotic tissue, and I do not think that we ever can cure an abscess after the peridental membrane is dead at the root and a granuloma has formed. The best that we can hope to do is to cure the sick, but don't think for a minute that you can raise the dead.

Dr. O. A. Van Kirk, Kendallville: In regard to devitalizing a tooth it seems to me there is but one way to make it look as though we are getting it done something near right. That is to use the X-ray on each case. Even with a perfectly-filled canal we may crowd in with our canal filling so much infected material that our tooth may abscess in spite of our well-filled canal. The average dentist does not guard against sepsis enough. I made a statement some time ago that I did not think it would be long before every tooth that was devitalized would be checked up with the X-ray, and the sooner we come to this the better it will be for our patients. I wish to relate a little incident in my practice: A lady, thirty-eight or forty years of age, came to me with a bridge from the right superior cuspid to first molar. The bridge had been set about four years and was sore continually. I took a radiogram of the abutment teeth. I found an abscess on the cuspid. Remembering the clinics of Drs. Logan and Buckley at our state society some time ago, I was then on the fence as to know whether to try to treat the abscess or extract the tooth. Those who saw those clinics, I believe will remember that Dr. Logan showed us a number of radiograms telling us that it was his opinion that certain infected teeth should be extracted. Dr. Buckley followed, showing us many cases infected equally as bad, giving the method under which they could be cured. However, I followed Dr. Logan's advice in this case, extracted the rooth and curetted the socket. This lady had had heart trouble for two and a half years. These attacks came on an average of a couple of times a month. She would be in bed with each attack from a few hours to a few days. About ten days after the tooth was extracted she had a slight attack of the heart. She has not had one since. Her physician told me that it was nothing but this tooth that had caused autointoxication and had caused the attacks on the heart. He also stated that he had told her mother some time previous that if these attacks kept increasing as they had in the past that it would prove fatal in the course of a year or two.

This case sort of brought that physician to realize the importance of the condition of the teeth to the general health of the individual. Previous to this, I may say that he was a total nonbeliever.

Dr. Davis, Hammond, Ind.: I would just like to ask the members of the profession here how many of them have had success with root filling, where the apex seemed to be perfectly sealed? I have tried it a number of times and found that I had my gutta-percha cone clear to the end but patients were having trouble and I extracted the root. I did not have one instance that was satisfactory, and that proved to me that no matter how well I do my work with the gutta-percha cone that would occur.

Dr. W. S. Walters, West LaFayette, Ind.: Dr. Pagen has touched me by his consistency. I am in Purdue right near the college and I see hundreds and hundreds of young men from all over the United States and I will say with Dr. Pagen, I am ashamed of the dental profession for the crowns they put on and call them crowns. I do not say all of them but a good many of them. I usually ask a man where his home is and who his dentist is and I often find that it is some classmate of mine. He has not studied and kept up with the times. He has gone away back and, as Dr. Pagen says, the easy way. And oftentimes when this crown goes on the tooth, there is no possible fit to it; you even get them to such an extent that that one would cover two teeth the same size.

Dr. J. A. Dinwiddie: I don't think that I have anything to say, except that in regard to the X-ray, it has been proven that it will help but I do not think it is always dependable.

Dr. W. L. Myer, Rensselaer: I think it already has been said but I want to state that I am not the encyclopedia for the Study Club, but I think I have a word that will do, I think "extrapadition" of the pulp, covers it.

It did me much good to listen to the men who have discussed the paper. First, I might say that I wish I could write a paper as good as the one Dr. Kelly has written. We find some men who try to tell us how to practice dentistry and I think that is one thing that we sometimes resent. We do not like to have some medical man try to tell us how it should be done and I am glad that I heard this paper read and appreciate it very much.

Dr. Meeker: Mr. Harter wants to know what I wanted him to say. He says, "I don't see what else they can say than what has been said," and I think he is nearly right. Dr. Van Kirk refers to Dr. Buckley proving to us that they could be saved and Dr. Logan that they could not be saved; when the second man had passed us we did not know whether we were going or coming. We had proof both ways. Less than six months ago I heard Dr. Price say, "I am not saying that we will say, but I think the time is coming when we will say, extract all teeth that have been abscessed."

Mr. Harter, Toledo, O.: I believe I do want to say a word or two. First, I want to ask you men to read a copy of The Dental Summary, containing an address by Dr. Chas. E. Emerson, of the State university, given before the State meeting in May, at Indianapolis. If you never have opened your Summary before that time, be sure and read that paper.

Another thing is, there have been published reports from the finest X-ray men on both sides. Some say that it is impossible, absolutely impossible, to depend on the X-ray. Dr. Lucas, of Indianapolis, made the statement that it was impossible to depend wholly upon the X-ray; that it was impossible to tell from the X-ray film whether the area indicated an abscessed condition or not and I have seen hundreds of films from both types. You cannot tell whether the picture indicates disease or recovery from disease. Of course, I simply take their word for this.

I know a man who is an expert at taking X-ray pictures. He suggested to me a plan by which we could educate the dentist in reading X-ray pictures. He proposed to prepare an album of sample prints, with titles indicating the condition shown. After an interval of about three months, he lost enthusiasm. I went to see him and wanted to know why. He said: "I don't know anything about it; I cannot tell anybody anything. I dare not say that a picture indicates this thing or another, because I don't know certainly. I am not going to send out a lot of misinformation; get a lot of people faked." He had learned by experience that he could not give any definite information to any one.

Now, if you will read Dr. Emerson's address and the discussion by some other physician—Dr. Kimberlin, I think—and also the discussion by Dr. Howard Raper, you will be doing yourself a good turn.

Dr. Kelly, Chicago, Ill. (closing): I have not much to add with the exception that the discussion has been delightful, especially some of these testimonials; but I don't want my friend to the right to think that all surgeons are operating promiscuously or anything of that sort. I do not think that the men who are trying to do real work do this. I am glad to note that the enthusiasm of the "kid" to my right has not waned after thirty years.

A CALL TO THE DENTAL PROFESSION FOR ACTION IN PROMPTLY URGING UNIVERSAL MILITARY TRAINING

Gentlemen:

The purpose of this communication is to invite your serious attention to lending your hearty support to the movement to provide at least six months' intensive training under military discipline, for each male citizen of this nation during his 19th year.

I believe you agree with me we should be vitally concerned in any plan which tends to increase the health and intelligence of our citizenship, and assist in freeing our Republic of destructive alien and class influences.

In this nation-wide movement for Universal Military Training I am sure the dental profession will avail itself of the opportunity to render the patriotic assistance this cause so justly deserves.

Very truly yours,

W. H. G. Logan,

President, National Dental Association.

(President Logan recently has been commissioned Lieut. Colonel, N. A.)

820 Mills Bldg., Washington, D. C., March 5, 1918.

During the present crisis in world affairs it is important that we think clearly and act decisively with respect to questions vitally affecting the future of the nation.

No question seems so deeply to concern the continued welfare, advancement and protection of the people as that of qualifying our diverse citizenship fully to discharge its obligations to their families and to their country.

Intensive Universal Training under military discipline is recommended as the "Citizens' College" and the "melting pot" not only to accomplish this purpose, but to fuse us into a united people with a strong, alert manhood.

Our knowledge of what it will mean to public health to educate one million young men each year for instance, in the proper care of their teeth—as required by army regulations—makes us realize the multitude of benefits which will result as by-products of the proposed six months' training for all boys of eighteen and over.

Patriotic service can be rendered by writing your Congressman promptly to support Universal Military Training, to be effective as soon as it can be handled without in any way interfering with the conduct of the war and by requesting others to take similar action. We must look ahead and do our part now. There are convincing reasons for action at this time.

OTTO U. KING,
Secretary, National Dental Association.
127 N. Dearborn St., Chicago, March 7, 1918.

It is so manifestly important that Congress enact legislation providing for Universal Military Training along the lines now proposed, and as soon as the cantonments are available, that the undersigned committee appointed to secure the co-operation of the profession in the United States recommends as follows:

First—That all Dentists write their Representatives in Congress at once, strongly requesting support for the passage of a law providing for Universal Military Training.

Second—That each Dentist request at least five other citizens to write similar letters.

Third—That all local societies appoint committees to secure publicity and favorable action by their Senators and Representatives in Congress.

Fourth—That all committees report the attitude of their Senators and Congressmen to the Secretary of the National Dental Society in Chicago.

In the opinion of the Committee, if this subject does not receive attention at this time when the public is interested in it there is grave danger that the opportunity to secure this patriotic, constructive and beneficial legislation may be lost as the result of the characteristic tendency of our people to fail to look ahead and to provide for any contingency, and also to overlook the necessity for the unification, the regeneration and the instruction of our diverse citizenship.

SPECIAL COMMITTEE ON UNIVERSAL TRAINING

C. N. JOHNSON,
Student Dean, Chicago College of Dental Surgery,

DONALD M. GALLIN,
Professor, Operative Dentistry, University of Illinois,

ARTHUR D. BLACK,
Dean, Dental Department, Northwestern University.

SUGGESTIONS

Conducted by F. R. Chapman, M.S., D.D.S., Columbus, Ohio

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.)

Use of Local Anesthetics

In referring to the general use of a local anesthetic, based upon wide experience, it is my opinion that the undesirable and annoying conditions that sometimes follow infiltration anesthesia are due to faulty technic or unusually unfavorable condition of the tissue. It is not reasonable to expect a prompt infiltration of any fluid in deeply-congested gums. When injecting an anesthetic solution into such tissue the quantity should be as small as possible to produce the desired anesthetic effect, and may require a wider distribution of injections than in reasonably normal and healthy structures. It will also require a longer time for complete anesthesia to be effected. Where too much fluid is injected into a highly-congested tissue, some destruction of the parts may be anticipated following extraction, especially if there is much trauma from the operation. This will vary according to the technic employed and the conditions with which the operator is working. Very embarrassing conditions may be produced by any aqueous solution, or even sterile water, although some operators may be tempted to lay the blame to the anesthetic agent. This is unfair both to the operator and the agent employed.—*P. J. Glugla, Michigan Dental Journal.*

Chloropercha Does Not Radiograph

I prepared four small straight root canals, as found in lower centrals. I broached them with a small reamer until the broach would protrude slightly through the apical end. I flooded the canals with ucalyptol, then pumped into the canals chloropercha as used by dentists generally for the past 30 years. This was pumped into the canal until it formed in a ball beyond the apex. A canal point was forced into the canal one-half the length of the canal, the canal point having been previously measured and cut to one-half the length of the root. The excess chloropercha was then wiped off the end of root.

These roots were then lightly waxed to the face side of a film and exposed full time, at the usual distance. The result showed nothing in the apical half of the roots, while the canal point showed up clearly for the portion it occupied. The above is easily proven, in which case I would like to ask how much does the radiograph show us about the presence or absence of root fillings placed, these 30 years?

I am at present using a radiodescent chloropercha made by adding eight grains of bismuth sub-nitrate to each drachm of chloroform before dissolving in the gutta percha.

Dentists and radiographers better try this experiment and stop to think a bit before they diagnose "no root filling" when the apical third seems open in the radiograph.—*W. Clyde Davis, Dental Review.*

The Fletcher Method of Mixing Amalgam

Fletcher's method consists in weighing the proportions of alloy and mercury, placing them in a small test tube and shaking the tube until all the free mercury disappears. The resulting powdery mix is then formed into a cylinder by compression in a wooden mould devised for the purpose. Dr. Osgood, an American dentist, effected an improvement a few years ago, by introducing a steel mould and plunger known as the Osgood-Fletcher mould.

An amalgam which, when mixed in the usual way, gives a preliminary contraction of one or two points and an expansion that exceeds the amount of contraction, will show no contraction and an increased expansion if mixed by Fletcher's method. An amalgam that shows one or two points of contraction and no expansion will show no contraction if the Fletcher mix be used. Of course, no method of mixing will turn a bad amalgam into a good one, but given a good alloy, then I venture to say that the Fletcher method will enable it to be used to the best advantage. The value of this method appears to consist in shaking the alloy and mercury together and so avoiding the rubbing which disturbs the harmony of the alloy. The principal, if not the sole value of the mould appears to be the formation of a mass that is solid enough to be readily conveyed to cavities when cut up into pieces of suitable size.—*W. C. Grayston, British Dental Journal.*

Vinegar for Softening Plaster of Paris

Vinegar, having the property of disintegrating plaster may be employed in the laboratory for removing plaster from flasks, by immersing for a few seconds only; for removing casts from articulator by applying over bows only; cleaning impression trays, etc.—*Lester N. Roubert, Dental Review.*

To Protect Steel Instruments From Rust

Make a solution of one part of good paraffin in 85 parts of benzine or gasoline and 15 parts of kerosene. Wash the instruments and dry them, then dip them in this solution and wrap them in tissue paper. When instruments are protected by this method they will not rust no matter if climatic conditions are unfavorable.—*F. W. Frahm, Pacific Dental Gazette.*

To Hold An Inlay While Cementing

You are setting an inlay in the back of the mouth. You need a handle on the inlay; you cannot pick it up with your fingers to place it; it may snap out of your pliers; just a drop of hard wax on the inlay. Now warm a square-end burnisher or amalgam plugger, place the point into the wax, instantly it is hard and you have the inlay so you can place it correctly after the cavity is smeared with cement and an instrument with which you can force it to place quickly, thus enabling you to use a thicker mix.—*E. J. Perry, Dental Review.*

Treatment After Extracting

To the best of my knowledge and by keeping a memorandum of teeth that I extract, I find that no less than 90 per cent are either abscessed or surrounded by cysts, or necrotic areas. Therefore, unless the sockets are curetted and treated you are depending upon Nature to do too much work, and in a great many cases where a patient is suffering from some systemic diseases, which may be due to infected teeth. An ordinary extraction will not benefit the patient whereas if treated surgically and aseptically, I find that we get excellent results. —*M. M. Rafkin, Dental Outlook.*

To Desensitize Teeth That Are Sensitive to Scaling

Dry sensitive part thoroughly. Apply for 4-5 minutes a hot saturated solution of potassium carbonate in glycerin on a pellet of cotton. Dry part with warm air. Repeat application leaving the cotton in place until the patient notices a burning sensation in the tooth, when the scaling may be continued painlessly. This solution will not cause discoloration.—*A. de Vries, Dental Review.*

Posts In Richmond Crowns

In re-soldering posts in Richmond crowns that have been removed by drilling out, a difficulty is often encountered in getting the solder to flow down the sides between the posts and the holes. If a little moss fibre gold that has been heated red hot and dipped in melted Parr's flux wax and then removed and allowed to drain, be packed in the place between the post and the gold, the solder will easily travel to the bottom. The gold treated this way makes a very good packing for a blow hole in a cast gold crown also, the solder disappearing into it like water in a sponge.—*R. McClinton, Commonwealth Dental Review.*

SOCIETY·ANNOUNCEMENTS

The American Academy of Prophylaxis and Periodontology

"Fifth annual meeting of the American Academy of Oral Prophylaxis and Periodontology, August 2 and 3, Edgewater Beach Hotel, Chicago."

Grace Rogers Spalding, *Secretary,*
Empire Bldg., Detroit, Mich.

Psi Omega Fraternity

The National Alumni Chapter of the Psi Omega Fraternity has established headquarters during the National Dental meeting at Room 230 Auditorium Hotel.

The business session of the National Alumni Chapter will be held in the New Ball Room of the Auditorium Hotel, Monday, August 5th, at 2:00 p. m.

The Psi Omega banquet will be held in the Florentine Room of the Congress Hotel at 7:00 p. m., Monday, August 5.

Psi Omegas who expect to attend the banquet should communicate at once with Dr. M. M. Printz, 4235 Lake Park Ave., Chicago.

Delta Sigma Delta Fraternity

The thirty-fourth annual meeting of the Supreme Chapter of Delta Sigma Delta Fraternity will be held in the Florentine Room of the Congress Hotel, Chicago, on Monday, August 5, 1918, at 9 a. m.

Headquarters of the Fraternity will be at the same hotel, where the annual banquet will also be held in the evening, in the Gold Room. (Notify Dinner Committee at once.)

By order of the Supreme Chapter.

Hy. W. Morgan, *Supreme Gr. Master,*
R. Hamill D. Swing, *Supreme Scribe.*

Alabama State

At a recent meeting of the Alabama Dental Association the largest and most interesting clinic of the kind ever held was given.

Dr. Geo. B. Winter, of St. Louis, gave a clinic of removing impacted lower third molars.

Col. Wm. A. Squires the head of Camp Sheridan Dental Corps and a member of the committee on arrangements, secured a number of patients from the Camp for the clinic. We also had some civilians for patients. Dr. Winter removed about thirty impacted teeth during the day.

Dr. Boyd S. Gardner, of St. Louis, came here a week before the Association and radiographed all the cases. Dr. Gardner is associated with Dr. Winter.

There was an actual attendance of over two hundred and fifty dentists and undoubtedly all of us doubted the reports that had reached us that Dr. Winter could remove these teeth on an average of one a minute or we thought he picked his cases.

But he gave us a surprise. He did not pick the easy ones but took them as they came, and two of these were as difficult cases as could be found. Several others were completely incased in the bone and no part could be seen until the bone was removed.

His time for the day was kept by two stop watches in the hands of doubters, and their record shows a fraction over fifty-one seconds per case.

Undoubtedly the technic developed by Dr. Winter far surpasses any thing heretofore given in this work.

Dr. Winter preceded his clinic by an instructive talk on Exodontia with slides showing every condition met by any one engaged in the practice of dentistry.

He has undeniably done more than any one in the profession in elevating this branch of dentistry from "tooth pulling" to a scientific surgical operation.

Xi Psi Phi Fraternity

The National Alumni Association of the Xi Psi Phi Fraternity has established headquarters during the National Dental meeting at Room 218, Auditorium Hotel.

The annual banquet will be held in the Crystal Ball Room of the Blackstone Hotel, Monday, August 5th, 7 P. M.

Members of the Xi Psi Phi Fraternity who expect to attend the banquet please communicate at once with Dr. H. B. Pinney, 25 East Washington Street, Chicago.

NATIONAL DENTAL ASSOCIATION ANNOUNCEMENTS

SIXTIETH ANNIVERSARY OF ORGANIZED DENTISTRY AND DEDICATION OF BLACK MEMORIAL

will be celebrated August 5-9, 1918, by rendering an unusual literary and clinical program at the Auditorium and Congress Hotels, Chicago, Illinois.

HOUSE OF DELEGATES—MONDAY, AUGUST 5

The Registration office for this great meeting will be open Monday morning at 8:30. The delegates to the House of Delegates will present their credentials and be seated at 10 A. M. This will be the big official business day of the meeting.

SEMINAR—THE MANAGEMENT OF PULPLESS TEETH—TUESDAY, AUGUST 6

9:30 A. M. Six of the best known scientific research authorities will submit "evidence and not opinions" on this subject.

THREE SECTION MEETINGS—TUESDAY, AUGUST 6

2:00 P. M. The Sections on Prosthetic Dentistry and Crown and Bridge Work will render a program on "Occlusion and Variable Occlusion" and "A Scientific Technic in the Construction of an Artificial Denture."

The Section on Oral Surgery and Anesthesia will present a program on "Cleft Palate and Harelip Procedures" and "Recent Progress in the Management of War Injuries of the Face and Jaws.'

The Section on Orthodontia and Periodontia have arranged for the following program:

"A Classification of Pathological Conditions of the Mouth." "Physiological Factors as Related to the Peridental Membrane, Cementum and Bone in Tooth Movement." "Orthodontic Appliances and Gingival Tissue." "The Histology and Development of Cementum." "The Duty and Responsibilities of the Orthodontist in the Present War." "The Necessity for Orthodontic Interference in Malocclusion of the Teeth."

MILITARY DENTISTRY—WAR SURGERY—TUESDAY, AUGUST 6

8:30 P. M. The speakers at this session will be surgeons of National and International reputation.

UNUSUAL SECTION PROGRAMS—SIX SECTIONS AND ORAL SURGERY CLINICS—WEDNESDAY, AUGUST 7.

9:00 A. M. The Sections on Operative Dentistry. Materia Medica and Therapeutics—Organization, Mouth Hygiene and Public Service—Research—The Preparedness League of American Dentists and General Oral Surgery Clinics will each present their programs in various rooms in the Auditorium and Congress Hotels.

2:00 P. M. The Sections on Prosthetic Dentistry and Crown and Bridge Work Oral Surgery and Anesthesia and Orthodontia and Periodontia will hold their second session Wednesday, at 2:00 P. M.

CANADIAN DENTISTS, OUR GUESTS—WEDNESDAY, AUGUST 7

8:00 P. M. How fitting it is, when the young men of the allied countries are freely and willingly giving their lives in the terrible conflict which is absorbing the attention of the entire world, when men and women of every station in life are making their first business the winning of the War, that the dentists of Canada and the United States should unite in holding their National meetings. The Canadian Dental Association will be the guests of the National Dental Association at this meeting and the program for the Third General Session for Wednesday evening will be furnished entirely by this Society. In the United States we have long since learned to follow the advice of Ruskin when he said

"Gain all the knowledge you can;
Then use it for the highest purpose."

INTERNATIONAL GENERAL CLINIC—150 CLINICIANS—THURSDAY, AUGUST 8

9:00 A. M. Clinics will be given by members of the Canadian Dental Association, representatives of forty states, and Alaska—Unit Clinics, Special Clinics on Root Canal and Crown and Bridge Work.

LUNCHEON TO OUR EX-PRESIDENTS

Former Presidents of the American, Southern and National Associations to be the guests of the Association at a luncheon in their honor by the members of the profession, who desire in this small way to show their appreciation of the valuable services they have rendered the profession and also to pay a just tribute to the Founders and Builders of Organized Dentistry.

DEDICATION OF THE BLACK MEMORIAL MONUMENT—THURSDAY, AUGUST 8

2:00 P. M. It has now been almost three yeares since the dental profession was deeply grieved to hear of the death of Doctor G. V. Black. Those who were present at the Panama Pacific Dental Congress at San Francisco will never forget, when his death was announced just at the opening of the Congress, how the cloud spread over that vast audience. In matters pertaining to Dentistry, Dr. Black was easily the master. If the world misses him, as it surely does, how much more do we miss him?

PATRIOTIC SERVICE—THURSDAY, AUGUST 8

8 00 P. M. Men of International and National reputation will be on the program for this unusual meeting, men who are the recognized leading statesmen, surgeons and divines of this age. It is quite fitting in this great war crisis that the dental profession should show its patriotic spirit by pledging anew its loyalty and devotion to our country. The speakers on this occasion will give the members of the dental profession an opportunity to hear the best men of the day discuss the vital problems that have to do with the present and future of our Republic.

GENERAL SESSION AND SECTION MEETINGS—FRIDAY, AUGUST 9

9 00 A. M. The Sections on Operative Dentistry, Materia Medica and Therapeutics, Organization, Mouth Hygiene and Public Service, Research, and the House of Delegates and the last general session will be the climax of this great meeting—an anniversary meeting that will go down through the years as having established a new high-water mark in the history of dentistry.

Be sure to be with us.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

ANNOUNCEMENT

Beginning July 1, 1918, the subscription price of The Dental Summary will be increased as follows:

United States and Possessions	$1.50
Canada	1.90
Foreign, U. P. U. Countries	2.25

This increase is made positively necessary by the rise in the price of paper and cost of production generally, and will remain in force only so long as war conditions prevail.

Subscriptions received prior to the date named will be accepted at the old rate.

To Our Subscribers

Since the outbreak of the war there has been a steady and very heavy increase in the cost of paper, ink, labor, and all other factors entering into the production of periodical publications. Heavy as this burden has become, Congress has added to it by increasing the charge for postage.

For more than three years we have carried this burden unaided, having, during that time, made no advance in the cost of subscription, although, as you are aware, many of the standard magazines of national and wide circulation have advanced their rates to a figure more nearly approximating their cost.

The time has arrived, however, when we feel obliged to ask our subscribers to assume a part of the load, which has become so great as to make it impossible for us to carry it alone.

Beginning with the July number, the price of subscription advances to $1.50 per year, and if your subscription expired with the June number, we most earnestly solicit the renewal of your subscription at the new rate, assuring you that, should normal conditions return, you shall have the benefit of any reduction that it becomes possible for us to make. As you well know, The Summary is not published for profit.

The Ddntal Summary stands for all that is best and most practical in dentistry; and that neither labor nor money has been spared to make it the one professional magazine that no dentist can afford to be without.

We trust and believe that you will support The Summary in this necessary advance with the same good will that we have shown in carrying on the work of publication until this time, without advance, in the face of conditions well known to all, entailiing severe loss, no part of which has been borne by the associations which the magazine represents.

If you have an account with the publishers or any dental dealer your subscription may be charged.

LACONIGRAMS

Now is the time to enlist in the great army of W. S. S. buyers. If you have an account in a savings bank, your interest was credited July 1. This means that you may transfer your savings to the custody of Uncle Sam without loss of interest already earned and at an increased rate of interest. War Savings Stamps are compounded quarterly instead of half-yearly, which, in the long run, amounts to quite a little. But, quite apart from advantage to you or to me, it seems to me that it is the duty of everyone of us to do his level best in all possible ways to support the government in the present crisis. I do not pose as a conscience-keeper; every man must be his own sole judge of his patriotic duty; but it would seem to be a small matter indeed to make such an exchange, whereby both security and income are increased.

The present membership of the Preparedness League of American Dentists is reported to be around 14,000. What is the matter with the other 30,000?

The time is not far distant when free dental service will be rendered to every school child needing it. It seems likely that much of this service will be voluntary on the part of the dental profession: but if it becomes general some public provision must be made for compensation. As the public will benefit greatly, the public should bear at least part of the burden.

Owing to war conditions, the dental college of New Jersey graduated only seven students June 10.

The Cleveland dental car is attracting much favorable comment in the lay press. The navy wants dental students to enlist, with the understanding that they may be allowed to continue their college course unless it becomes positively necessary to call them to the colors .

The Baylor University College of Medicine, Dallas, Texas, has taken over the State Dental College, with all its assets and students, and has bought the old Southwestern University Medical College for the purpose of housing its new acquisition. The change was made with the support of the Government, with the view of enlarging the dental school and placing it in Class A, as a first-class dental college is needed in Texas.

Twenty thousand farriers for 250,000 horses, and only 1,000 dentists for a million men! It's the same old story: Millions of public money to fight hog-cholera, but not a cent to fight tuberculosis. How cheap a thing human life seems to be in the minds of our penny legislators.

The Cleveland Mouth Hygiene Association has selected Dr. W. J. Hagedorn to succeed Dr. Leon Newman, who has gone to Camp Meade, Md., to join his dental corps. During the nine months that Dr. Newman had charge of the two dispensaries conducted by the Association, he filled 1,639 appointments, and made for himself a life-long friend of every child treated. The dispensaries are under the management of Dr. H. R. C. Wilson, secretary-treasurer of the Mouth Hygiene Association.

So-called Trench Mouth is now diagnosed as Vincent's Angina, and is successfully treated by painting the gums with salvarsan or an arsenical solution, recovery following in two to three weeks. Both English and Hun troops are troubled with it, the latter assigning the eating of army bread as the cause.

Reports indicate that comparatively few drafted men are taking advantage of the opportunity to secure free dental service, most of them seemingly preferring to select their own dentist and pay for the service.

The dental laboratories at 25 West Forty-fifth street, New York, have been taken over by the Y. M. C. A., and arrangements made to accommodate 150 wounded soldiers who are to be taught mechanical dentistry, being part of the reconstruction work undertaken by the Association.

Dr. Horton B. Peck, of Reed City, Mich., now in his ninetieth year, still hale and hearty, puts in full time every day in the practice of his profession. He is, no doubt, the oldest practitioner in Michigan. His office is completely equipped with modern appliances, including electrical apparatus, although he still beats his own gold. He has been practicing in the same locality for 46 years, today treating the children, the grand-children and the great-grand-children of his first patients, those who came to him when most of Michigan was more or less a wilderness, particularly that part of it in which he began practice in a log cabin.

Twenty-nine South African students are attending the Michigan dental college—more than the total number enrolled at all of the other American and English schools combined.

Dr. F. W. Olwin, formerly associated with Dr. "Bob" Gillis of Hammond, Ind., now located at Robinson, Ill., has been appointed on the Illinois State Board of Examiners.

A Chicago dentist is being prosecuted for criminal carelessness by the parents of a twelve-year-old boy who died as result of infection that it is alleged was caused by an unsanitary operation.

More drafted men have been rejected on account of bad teeth and other mouth conditions than for any other single cause except eye-trouble; and most of these conditions may be traced to improper care of the teeth in infancy. Dentists must become instructors as well as operators. Every adult patient should be taught how to care for the mouths and teeth of children if the coming American is to be made fit to take his part in the work of the world, either in peace or war.

Black teeth would be an interesting novelty in the mouths of Americans, but a large trade exists in the sabel-hued dentures between this country and many islands in the Pacific, including the Philippines where the natives frequently have their natural set extracted and a full set of black teeth substituted. Nothing like being in fashion.

Three hundred and sixty-five women are serving as dental assistants under the auspices of the Preparedness League, in conjunction with the American Women's Hospitals.

It is foreshadowed that the Government may ask dentists to find some substitute for the $11,000,000 of gold now used annually in fillings. In that case it would seem likely that alloy may come into its own.

Dentistry to the accompaniment of bursting shells so near as to make the whizzing of splinters plainly audible is common on the American front. It is an experience very well worth while.

Dr. Chas. H. Oakman has been doing some missionary work throughout Michigan in the interest of local free dental clinics. He spoke at Flint June 4.

At the recent meeting of the Iowa State Association, a resolution was adopted pledging its members not to purchase or use a single article made in Germany for a period of fifty years after the close of the war. Now, let's make it unanimous. If the American people succeed in crawling out from under the yoke imposed upon them during the past fifty years by the Hun conspirators, they ought to have sense enough to stay out forever. Personally, I would prefer to have a molar extracted with a Stillson wrench rather than with the finest pair of forceps ever "made in Germany." Let's make that phase the trade-mark" of infamy while the world stands.

The world will find the education of the Hun a stupendous task, far greater than that of civilizing the veriest savage. It is far easier to fill an empty vessel than it is to empty one filled with hardened concrete—and that must be done in the case of the Prussian consciousness, which has been loaded with insane conceptions of right and wrong, the whole stoppered with the crazy notion that only Prussia is right, and all the rest of us dead wrong.

Industrial dentistry is just as much a part of welfare work as is good housing. No matter how well housed a workman may be unless he has good teeth he is lame at a vital spot. If any of the large plants in your neighborhood have not shown an interest in this phase of dentistry, make it your business to visit that plant and make a beginning by talking the matter over with the management. Usually you will be well received.

Patriotism that is not radical is not worthy of the name. Suspect every man and woman who is not radically pro-American and anti-Hun. If you haven't a branch of the American Defense League in your town, now is the time to get busy. Every equivocal word should be noted and reported. Keep your eyes and ears wide open. If you do not know what to do with the information obtained, send it to me; I DO.

Dr. M. M. House, Indianapolis, is still busy spreading the good gospel of better dentures. His latest visit was to Hamilton, Ohio, where he addressed the Butler county society.

Some time ago Germany announced that the Polish Question had been settled! O, certainly! Settled by a Polish division, serving under its own flag and its own officers, on the western front. Come on with your sledge and your trephine, and let's see if we cannot pound into the Hun mind the one stupendous fact that "Nothing ever is settled until it is settled right."

If you can't shoot, you can buy W. S. S. Your money will buy bullets that more favored men know well how to use in the good cause.

About two-thirds of the selects rejected on account of poor teeth need only a little dental service to pass in the first class. See that every one of them gets it—free, if necessary.

McGill University, Montreal, has at last admitted women on an equality with men.

Federal control of all narcotic and habit-forming drugs is about to be inaugurated. It would seem to be high time, when, in one raid, a dentist and a physician are arrested for dispensing such dope.

Ohio—Northern

The meeting of the Northern Ohio Dental association at Toledo June 6-7-8, was a success professionally, although the attendance was not quite up to the average. The clinics were of an unusually fine character, those especially notable being:

Direct Method for Cast Inlays—Drs. J. C. and M. H. Mortonson, Milwaukee, and Dr. Willis A. Coston, Topeka, Kansas.

Surgical Clinic under Local Anesthesia—Dr. C. H. Oakman, Detroit, and Dr. E. E. Pangborn Chicago.

Root-Canal Operation—Dr. H. D. Grubb, Cleveland.

Simplicity of Chayes Attachment—Dr. F. L. Olds, Cleveland.

Correctable Plate Models — Dr. Lloyd Rogers, Detroit.

Taking Bite and Mounting—Dr. Charles Lane, Detroit.

Porcelain Jacket Crowns—Dr. George A. Thompson Chicago.

Papers were read by Drs. George B. Thomas, Cleveland; L. L. Barber, Toledo; C. H. Oakman, Detroit; J. W. Beach, Buffalo.

The officers chosen for the coming year are: President, Guy D. Lovett, Cleveland; Vice-President. J. A. Loughry, Cleveland; Secretary, G. B Smith, Fremont; Treasurer, G. B, Speith, Warren.

The golf tournament Friday morning and the dinner-dance in the evening of the same day made up the chief social features.

Drs. J. W. Hartshorn, W. W. Penske and R. H. Vollmayer had the entertainment program in hand.

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Dr. C. W. Putt Dies

Holland, Mich., June 26—Dr. Carlos W. Putt of Bellaire, Mich., died suddenly of heart disease at Holland hospital Tuesday afternoon. He had taken treatment here for two months. Dr. Putt was 44 years of age and practiced dentistry for 20 years. He was a lifelong friend of THE SUMMARY and its publishers.

A Correction

In our May number appeared a contribution from the pen of Dr. F. E. Williams, Los Angeles, Cal. An error occurred in the title, which should have read, "Interior Arch Correction," instead of "Internal."

The dentists of Nebraska have just completed a $1,000.00 fund for the Nebraska Base Hospital, unit No. 49, for use in the dental department of that institution. Only two circular letters were required to bring in the sum of money from about 600 dentists solicited. The membership of the State Society is a little less than 400.

South Dakota—State

Sioux Falls, May 31.—At the business meeting yesterday afternoon the following officers were elected for the coming year:

President, G. W. Collins, Vermillion; Vice-President, George Kimball, Mitchell; Secretary, E. W. Elmen, Sioux Falls; Treasurer, Dr. Ferd Brown, Sioux Falls, (re-elected). Mitchell was chosen as the place of next year's convention.

For delegates to the convention of the National Dental Association, to be held in Chicago August 5-9, inclusive, Dr. Collins, of Vermillion, and Dr. Davis, of Armour, were selected. Alternates are Dr. Price, of Centerville, and Dr. Wilson, of Miller.

Resolutions were passed at the business meeting yesterday remitting dues of all members of the association who are in the country's service and a resolution was adopted asking that the national association make the same ruling with regard to its members.

Illinois—State

Bloomington, Ill., May 17.—Six hundred dentists attended the State Convention that adjourned at noon today.

The next convention will be held at Peoria in May, 1919. Dr. C. E. Bentley, of Chicago, was appointed by President J. E. Hinkins, the retiring head of the society, to head a committee of three to revise the plan for conducting conventions, and to make recommendations for increasing the finances and to investigate the advisability of providing that all future conventions will be alternately in Chicago and in either Peoria and Springfield, one year in the metropolis, and the following year in one of the two downstate cities. Action on the matter was laid on the table for one year.

OFFICERS ELECTED

Bloomington dentists were highly honored by the society in electing officers. George D. Sitherwood was elected vice-president; O. J. Jarrett was appointed chairman of the Committee on the Infraction of the Ethical Code; S. B. Powers; member of the Public Service Commission; J. R. Reece. alternate delegate to the National Dental Association meeting at Chicago in August.

Dr. Sitherwood, Dr. Jarrett and Dr. S. B. Powers were all thanked by the convention at the final session this morning for the part they had in making this convention a great success.

The new officers follow: President, L. B. Torrence, Chester; Vice-President, George D. Sitherwood, Bloomington; Secretary, J. P. Luthringer, Peoria; Treasurer, T. L. Grisamore, Chicago; Librarian, G. H. Henderson, Chicago.

Classified Advertisements under this heading, $2.00 each for 60 words or less; additional space, 2 cents per word, single insertion; three insertions or more, special rate on application.

FOR SALE—Fine Office and Ethical Practice in one of the best dental towns of 10,000 population in Northern Ohio. This is a snap for someone; fine opening for a young man. Reason for selling, other business that demands all my time. Don't write unless you mean business and want something good. Address D. E. L., 710C, care The Dental Summary.

FOR SALE—Quick to cash buyer—account of death—one of the best dental practices, established twenty years in hustling city of 20,000 population. one of the best of its size in Western Pennsylvania. Address 720C, care The Dental Summary.

FOR SALE—First-class, well-equipped office and practice of $3,500, in good Ohio town of 2500. Established 25 years. Everything in A1 order. One other dentist. Price $1,500. Terms to suit. Reason for selling—owner called to the colors. A splendid opportunity. Address 740C, care The Dental Summary.

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CAUSES OF FAILURE AND UNTOWARD RESULTS IN CONDUCTIVE ANESTHESIA*

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Unlike numerous *innovations* in dentistry, conductive anesthesia has successfully steered past the shallows and cliffs of *fadism.* Surprisingly few indeed have been the open admissions and reports of failure or untoward results arising from the employment of this method, although the men who have been pioneers and instructors in this doctrine know very well, from consultations and daily correspondence, that dis-

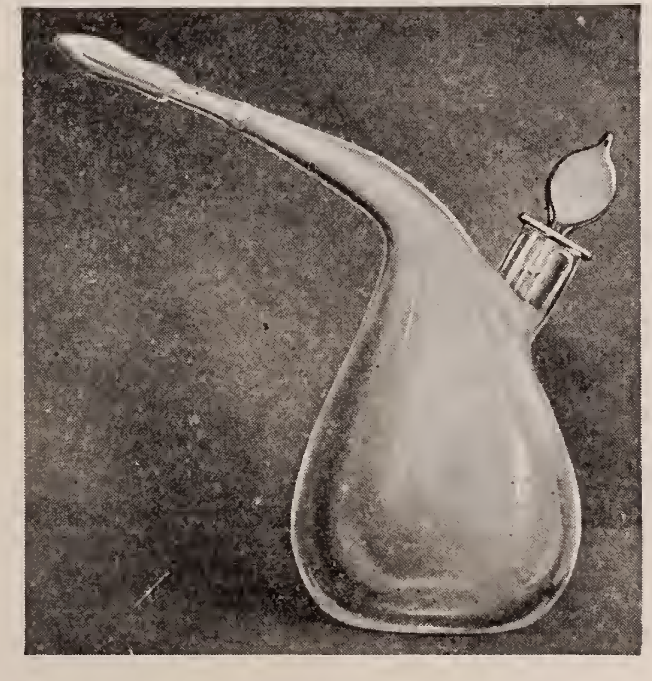

Fig. 1—Author's improved container for Ringer Solution.

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*Read before the Joint Meeting of the Interstate Association of Anesthetists and the Mississippi Valley Medical Association, Toledo, O.. October 9-11, 1917; also the Annual Meeting of the Ohio State Dental Society, Cleveland. O., December 4-6, 1917.

appointments and failures have been attending the efforts of their followers and pupils. To point out the most prevalent and most likely pitfalls that may be encountered in the routine practice of conductive anesthesia, is the purpose of this investigation.

Conductive anesthesia has by no means had an easy road to acknowledgment. The manufacturers of apparatus and the professional advocates of general anesthesia were for several years so busy deprecating the appearance and the advocacy of conductive anesthesia that, in their blind zeal, they heaped a full measure of wrath upon conductive anesthesia,—usually without knowing the first principles about it,—ruined their own stock-in-trade by belittling the intricacies and exacting requirements of general anesthesia, and overlooked entirely such moder-

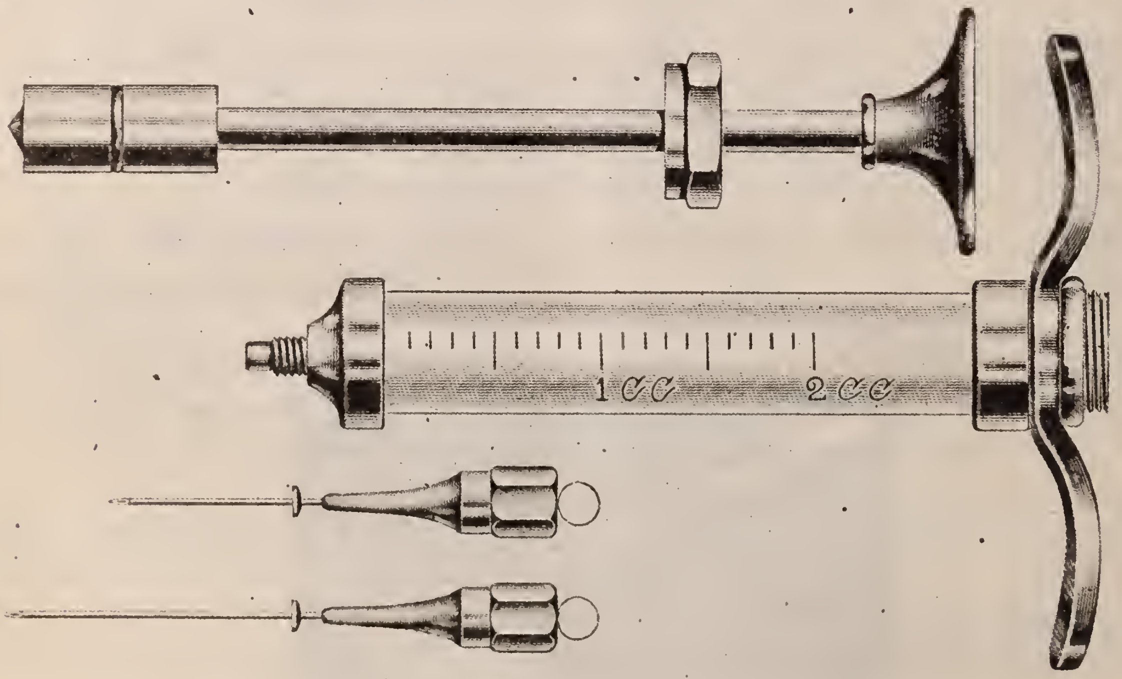


Fig. 2—This syringe holds 2½ c. c. In its design, delicacy and lightness have been prime considerations. It is an all glass and metal syringe without washers of any kind, which for purposes of sterilization is taken apart in two sections. The glass and metal are annealed in such a way as to permit of vigorous prolonged boiling. All knurled corrugated surfaces are avoided, and all corners are rounded off and the piston is made to end in a graceful indented end in which the ball of the thumb fits snugly. The cross-bar moves readily and the barrel is long enough so that the operator's second and third fingers find ample working space between cross-bar and cheek so as not to obscure the field of vision. Although very light pressure only is required in conductive anesthesia. the syringe is tested to 30 lbs. pressure so as to allow of infiltration without regurgitation. To prevent the migration of a broken needle into deeper strata of tissue, the needles have been provided with a safety disc, wider than the lumen of the needle perforation, so that the needle fragment is automatically arrested. Since, according to the laws of mechanics, the needle, no matter whether of steel or iridio-platinum, must break at the orifice of the hub to which the needle is attached, the risk of losing a needle is eliminated, which fact may be especially appreciated by the beginner. To facilitate finding the inclination of the bevel of the needle, a mark is placed on the hexagonal hub in such a way that visibility of the mark indicates pointing of the bevel of the needle toward the bone. To avoid confusion the hubs of steel needles are nickel-plated, those of iridio-platinum are gold-plated.

ate and truly fair statements as those made by the writer in *Dental Cosmos*, July, 1915, that *"no dental operator who is familiar with but one method of anesthesia should consider himself competent in anesthesia, nor can any dental office which offers anesthetic facilities of but one kind be regarded as efficiently equipped."*

PROPRIETARY ANESTHETIC PREPARATIONS AND MEDICO-LEGAL ASPECTS OF THEIR USE

A goodly number of proprietary anesthetic preparations have been flooding the market for years, most of them containing cocain originally as their anesthetic agent, together with non-essential secret admixtures, tending chiefly to aid in preserving the solutions. As novocain gained more and more in popularity, some of these proprietaries adopted the safer drug, still adhering to their admixtures. Any untoward sequelæ resulting from the use of such secret preparations naturally leave the user in a disadvantageous position before a jury in case of suit for damages, since a complete knowledge of the ingredients and their

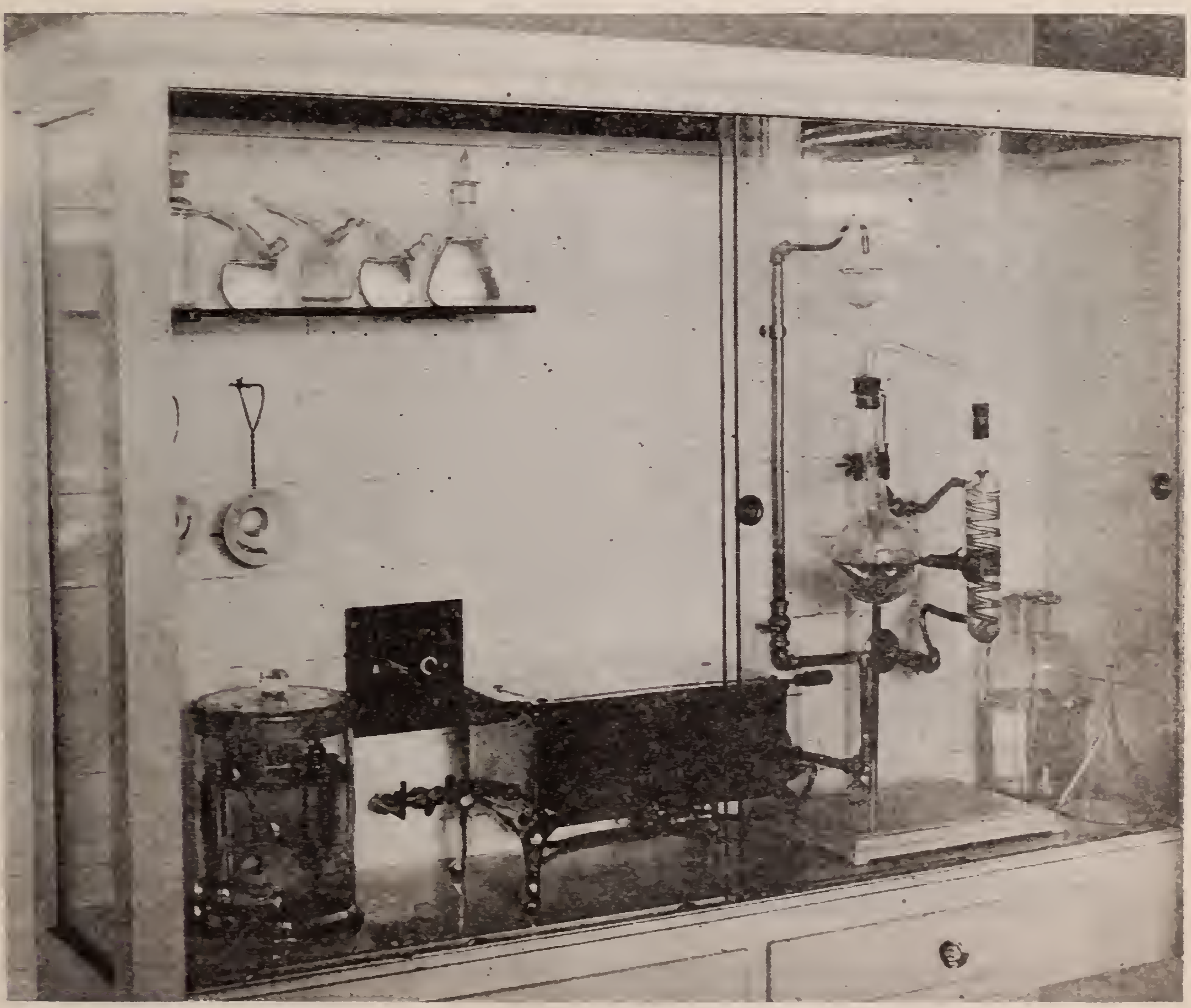


Fig. 3—Aseptic wall cabinet for storing water-still, instrument sterilizer, syringe jars, boiling cups and flasks of Ringer solution and distilled sterile water. (Courtesy of Dr. M. E. Turner, Atlanta, Ga.)

percentages in any mixture employed is acknowledged as the alpha and omega of ethical practice. As the nature and chemical composition of both cocain and novocain seem so little understood even by their daily users, it appears not amiss to go for a moment into the detail of their chemistry.

COCAIN

The development of local anesthesia dates from the isolation of the alkaloid cocain from coca leaves achieved in 1860. This oldest local anesthetic originally was used as a powerful excitant only, which increased the capacity for muscular exertion and reduced fatigue. Koller's discovery, made in 1884, of its property of temporarily producing insensibility of the nerve endings, inaugurated the general use of cocain as a local anesthetic.

Systematic research soon was begun with the object of determining the chemical structure of cocain. It was found that this substance was built up of benzoic acid, methyl alcohol, and an alkaloïdal body to which the name ecgonine was given. The recent work of Willstatter, who first discovered the chemical structure of ecgonine, led at the same time to a complete understanding of the chemical structure of cocain.

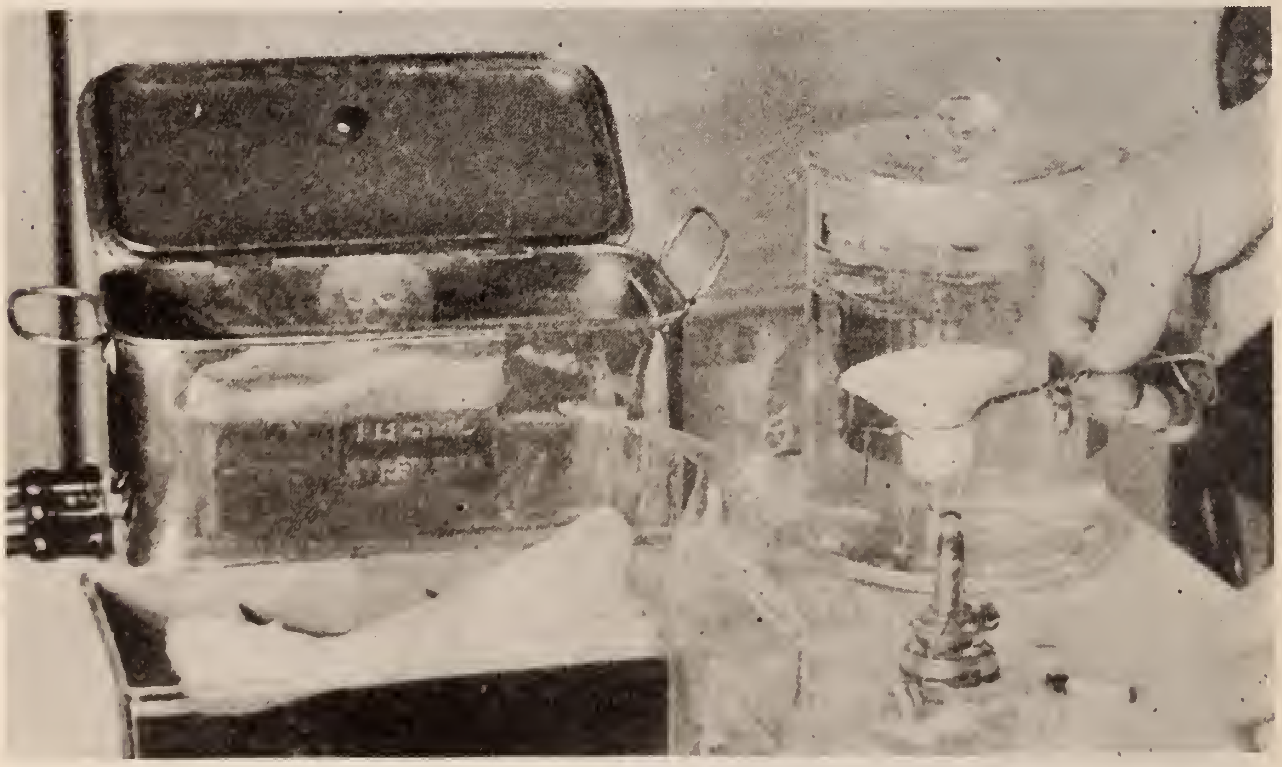


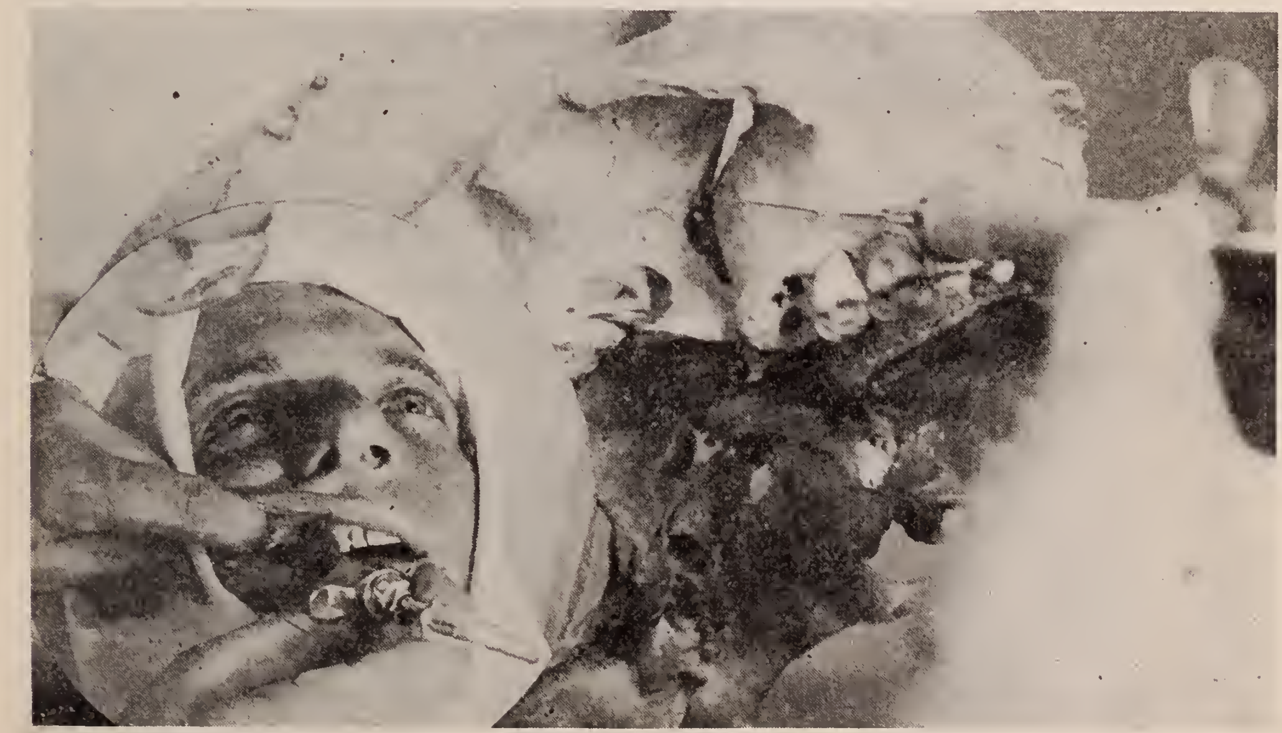
Fig. 4—Table and equipment devoted exclusively to the preparation of novocain-suprarenin solutions. Sterilizing solution in porcelain cup over an alcohol flame.

Pharmacologists and chemists thus were enabled to co-operate in determining the relationship between the chemical structure of the cocain molecule and its physiological action. It was found that the anesthetic action of cocain is developed by esterification with benzoic acid, and the theory was advanced that the benzoyl group acts as an "anchoring group" which interlocks the substance with the tissues, producing the physiological, viz., well-known anesthetic action.

With the rapid extension of the use of cocain as a therapeutic agent, certain disadvantages became apparent, such as fluctuations in supplies and high prices, pronounced toxicity, and the fact that cocain solutions are not sufficiently staple to permit sterilization by boiling. Moreover, the habit-forming property, with its sinister sequelæ of pathological and moral degeneration, revealed such a serious aspect that even legislative measures had to be invoked to protect society against "cocainism." As the chemical nature of cocain and its physiological action became understood, the next aim of research was to produce synthetic preparations possessing the anesthetic properties of cocain without the disadvantages attending its use.

SYNTHETIC LOCAL ANESTHETICS

It was found that a great many organic substances possess the power of temporarily decreasing the sensibility of nerve tissues. In fact, some investigators expressed the belief that no other physiological



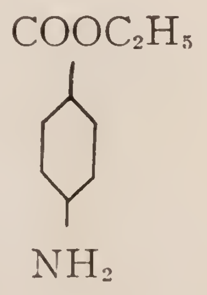
Figs. 5, 6—Right Tuberosity Injection. The posterior and middle alvelar foramina, located back of the maxillary tuberosity, below and behind the zygoma, give passage to the posterior and middle superior alveolar nerves, innervating the soft tissues facially, the bone and pulps at the first, second and third molars, and first and second bicuspids. The needle is inserted in the reflection of the mucous membrane back of the distal root of the first molar and advanced on the bony surface—without discharging solution—in an upward, backward and inward direction. When the needle is inserted to full length, ¾ of the contents of the syringe are discharged. If the bicuspids are also to be obtunded the remaining ¼ of the syringe contents is discharged as the needle is withdrawn. Patient's head in reclining posture; mouth closed, cheek retracted. Quantity of solution, 2 c. c.

property occurs as frequently in these compounds. Particularly among the esters of aromatic acids, to which class cocain belongs, does the anesthetic action seem to appear most frequently. In 1910 Einhorn, basing his conclusions upon the results of very searching tests, advanced the general principle that "all esters of aromatic acids have the property of producing local anesthesia". The degree of the anesthetic power of the different esters naturally ranges from a barely perceptible decrease in sensibility to profound and long continued anesthesia. Einhorn's principle, therefore, covers practically all of the newer soluble and insoluble local anesthetics. Many hundreds of such esters have been physiologically tested, but only a few "typical" compounds have been adopted in practice. These few types have been selected from a large number of similarly-constituted substances, since careful and extensive observation had proved that they came closest to fulfilling the requirements of an ideal local anesthetic.

The typical esters may, from a chemical point of view, be divided into three groups, according to their chemical structure:

I. *Esters of para-amino-benzoic acid with aliphatic alcohols.* They are insoluble crystalline substances which are unsuitable for injections. In these esters, advantage is taken of the fact that, while benzoic esters usually exert an irritating action upon the tissues, the corresponding para-amino-benzoic esters are devoid of this untoward property.

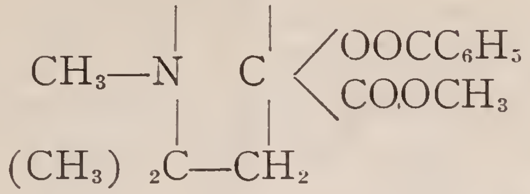
Anesthesin, suggested by Ritsert, and physiologically tested by Benz and Kobert, is typical of this class of esters. Its chemical formula is:



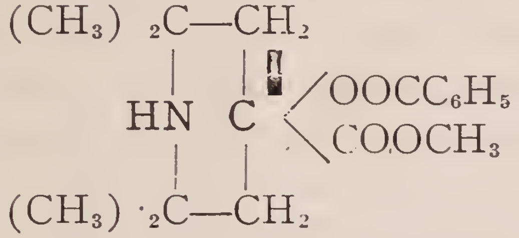
"Propaesin" and *"Cycloform"* are corresponding propyl and isobutyl esters.

II. *Aromatic esters of basic alcohols with ring structure.* In these esters, as well as in the next class, a strongly-basic group has been introduced into the molecule, which, when combined with an acid, forms a readily soluble salt and gives a neutral solution which may be sterilized by boiling.

To this class of soluble anesthetics belong the *eucains,* which are the direct result of the chemist's attempts to approximate the chemical structure of cocain. Their irritant action upon the tissues and their tendency to cause hemorrhage militate against their practical use, and detract from their value as substitutes for cocain. The chemical structure of *alpha* and *beta* eucain is as follows:

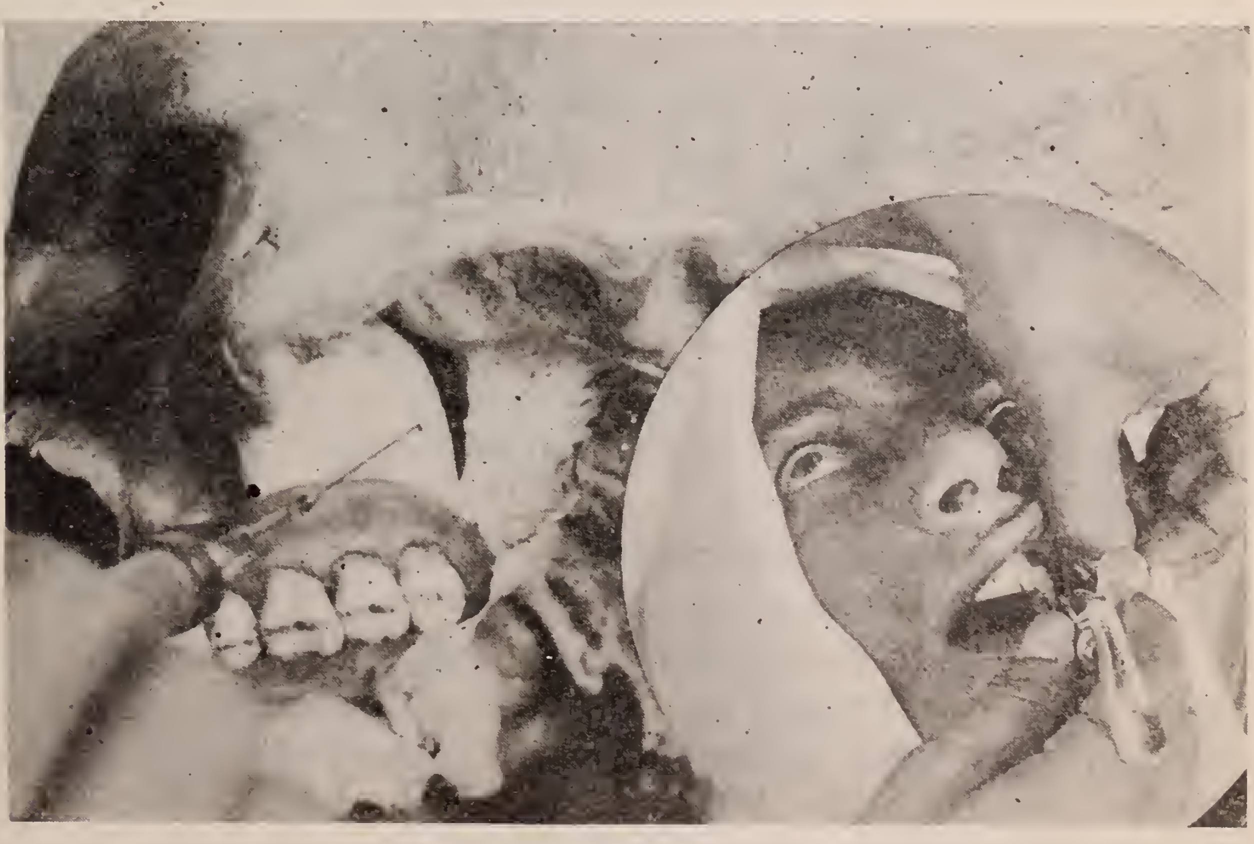


A—Eucain
(Alpha)



B—Eucain
(Beta)

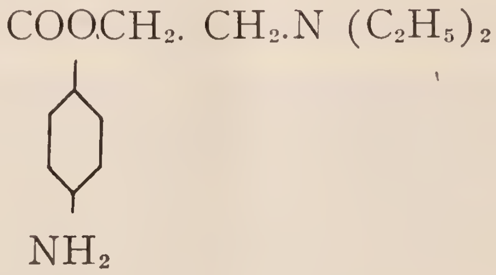
III. *Aromatic esters of basic alcohols with open chain structure.* In recent years attention has centered chiefly on this class of alkamine esters, a number of which have gone into practical use. The best known examples of this group are *stovain, alypin* and *novocain.*



Figs. 7, 8—Left Tuberosity Injection.

Einhorn, who had examined a number of alkamine esters of benzoic acid and had found that they produced considerable irritation in the tissues, attempted to overcome this undesirable effect, and at the same time to increase their anesthetic power by replacing benzoic acid with its para-amino derivative. He was completely successful in this attempt, thereby confirming his experience in the field of synthetic anesthetics, which had indicated that among the derivatives of the aromatic acids, those containing an amido group in the ring manifested less irritant properties than did the corresponding derivatives in which such an amido group was lacking. From the large number of alkamine esters of aromatic amino- and polyamino-acids prepared in his laboratory, the diethyl amino ethanol ester of p-amido-benzoic acid was selected as the most satisfactory. It conformed so completely to the pharmacological and clinical requirements that in 1905 its hydrochlorid was introduced under the name of Novocain* into materia medica by Braun in his classic work on "Local Anesthesia: Its Scientific Basis and Practical Uses". Since then an extraordinarily large number of medical and dental investigators have demonstrated the unique value of this local anesthetic, confirming its prompt and powerful anesthetic action with minimum of toxicity and complete absence of tissue irritation and habit-forming properties.

The chemical formula of novocain is as follows:



REQUIREMENTS OF AN IDEAL LOCAL ANESTHETIC

It appears that so far none of the homologues or the many possible modifications of the synthetic substitutes measures up to the selected few local anesthetics adopted by the medical profession, for which Braun has set the following standard:

First: The substance must be less toxic than cocain in proportion to its local anesthetic power.

Second: The agent must not cause the slightest irritation or tissue injury, but must be absorbed from the place of application without any secondary effects, such as severe hyperemia, inflammation, painful infiltrates or necrosis. Only when these conditions are fulfilled can we assume that the healing of wounds will not be interfered with. The use of strongly acid or alkaline reacting substances is not permissible, inasmuch as they cause local tissue injury. On account of this important requirement many of the newer anesthetics have failed in their purpose.

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*Now known as Procain in America, and is an American product.—Ed.

Third: The agent must be soluble in water and its solutions stable and possible of sterilization by boiling.

Fourth: It must be possible to combine the agent with suprarenin.

Fifth: For particular places of application, as for instance, mucous membranes, the anesthetic must be able to penetrate rapidly, its anesthetic properties being dependent upon this quality.

NOVOCAIN-SUPRARENIN SOLUTIONS

Coming now to the actual causes for failures in conductive anesthesia, the preparation of solutions merits special attention. Stock solutions or proprietaries are *a priori* objectionable, since their keeping property depends upon antiseptics of some kind or other which, when injected, act unfavorably upon the tissues and frequently produce after-pain or even sloughing. As long as these concoctions are administered by way of infiltration only, the possible damage, which is of necrotic nature, may be confined to relatively-superficial strata of tissue; for conductive anesthesia, however, their employment involves serious risk. The remedial alleviation of such untoward results, moreover, is complicated by the operator's ignorance of the quantity and nature of the antiseptics admixed, placing him in an extremely disadvantageous position medico-legally. Conscientious operators will strictly adhere to the principle that, if a patient is worth while treating, he is worth while making a fresh solution of definite constituency and percentage for.

Attempts have been made to combine the physiologic amount of sodium chlorid or Ringer ingredients with novocain-suprarenin to save the time and trouble of making a normal salt or Ringer stock solution separately. This, like other admixtures, is contraindicated as the combination of NaCl and suprarenin is unstable, and such combination tablets almost invariably yield discolored solutions.

This disadvantage was pointed out by the writer as early as 1914 (*Dental Cosmos,* December 1914):

> "The addition of sodium chlorid to novocain-suprarenin tablets for the purpose of simplifying the preparation of isotonic solutions, as practiced by some drug houses, should be discouraged, since they give discolored solutions within a very short time after purchase, and especially after a tube has been broached, proving that the combination of novocain-suprarenin and sodium chlorid is very unstable, chiefly owing to the hygroscopic property of sodium chlorid."

Nevertheless, a United States patent upon this combination in principle has been granted.

Improper methods of preserving the tubes in which tablets are marketed, are a prolific source of annoyance to the operator. Prolonged exposure to heat, light and moisture results in docomposition of the tablets despite the precautions in packing exercised by the manufacturers. Dentists as a rule are very careless in their manner of preserving drugs, as a glance at the carbolic acid, silver nitrate, hydrogen peroxid or iodin contained in the average medicine cabinet will attest. The writer has been able to preserve tubes of novocain-suprarenin tablets without decomposition for years by placing his stock in a tightly-closed Mason jar set in an equally tight tin bucket which combination seems to act

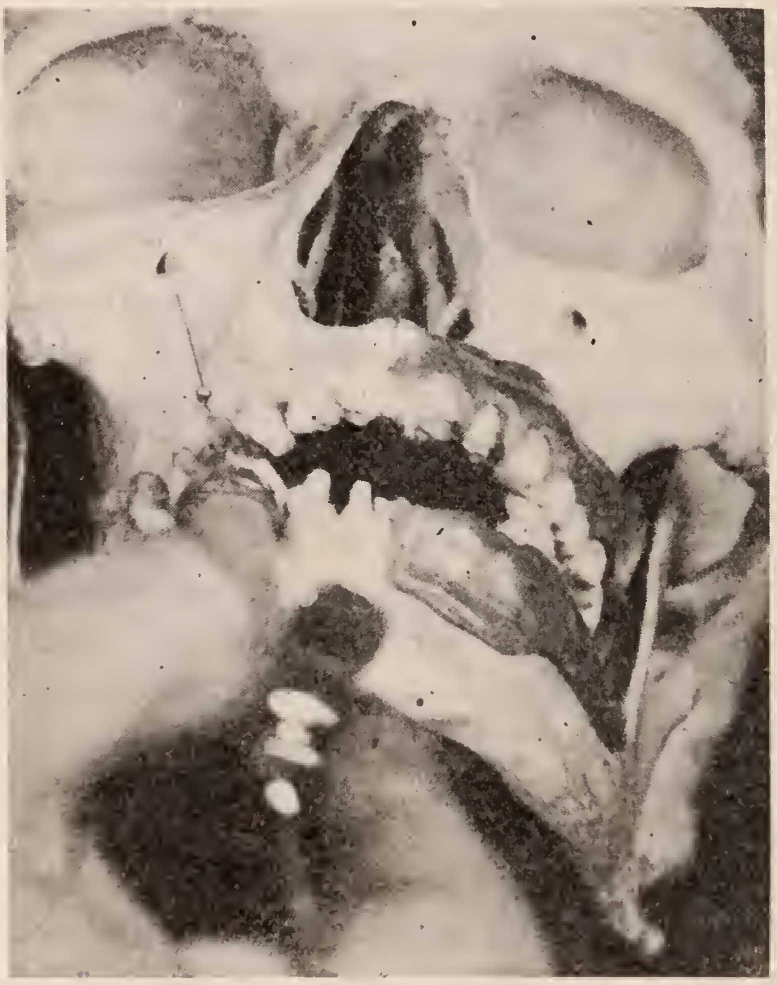


Fig. 9

Figs. 9, 10—Right and Left Infraorbital Injections. The infraorbital foramen, emitting the anterior superior alveolar branch, innervates the soft tissues facially, the bone and pulps of the central and lateral incisors and the canines. Owing to anastomosis of the middle superior alveolar branch the first bicuspid is also obtunded. Palpate lower border of orbit on face, press index finger over infraorbital foramen. The needle is inserted in the reflection of the mucous membrane distally to the canine root, advancing needle to about ½ its length, while continually discharging solution until the needle is felt under the palpating finger. Patient's head in reclining posture, mouth closed, upper lip retracted with the thumb. Quantity of solution, 1 c. c. to 1.25 c. c.

as a sort of improvised thermostat when set away in a dark, cool closet of even room temperature. Additional stability of tablets is insured by dipping unbroached tubes into a solution of low-melting paraffin. Not more than one tube is ever broached at one time, and the sterile cotton and rubber stopper are immediately replaced under aseptic precautions. Prolonged direct contact between the uppermost tablet and the rubber stopper results in a reaction between the tablet and the sulphur in the rubber as manifested by brown discoloration of the tablet. It seems also that tablets prepared and packed during humid summer days are more prone to discoloration than those made up during the cooler months.

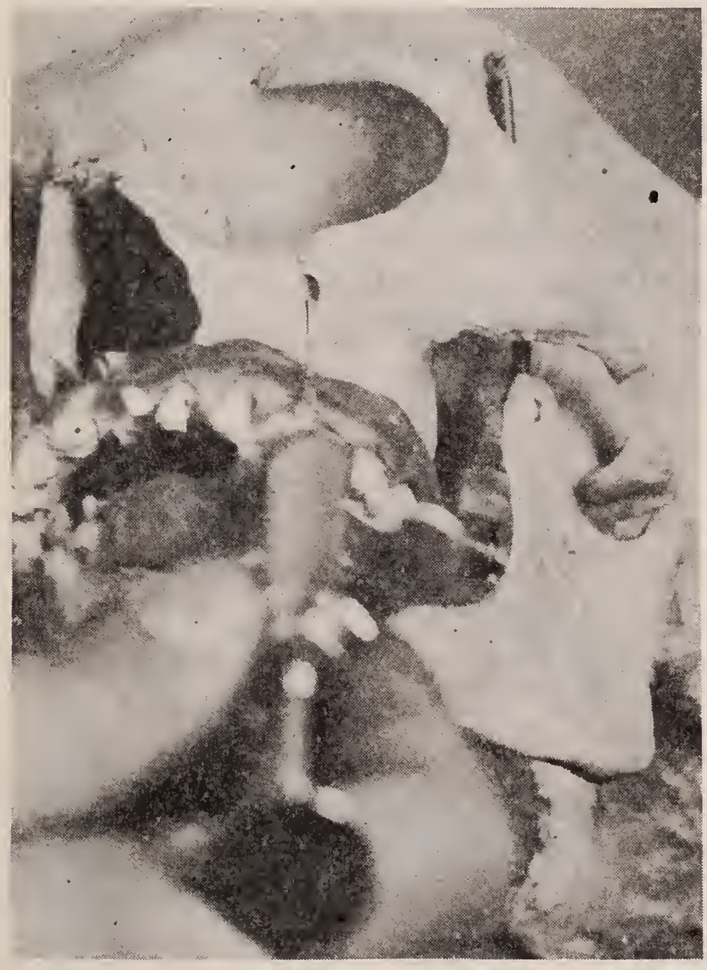


Fig. 10

Discolored solutions are viewed by most operators with suspicion and rejected. When this discoloration is due to intrinsic decomposition of the tablets or to organic contamination or alkalinity of the distilled water or the dissolving cup, this attitude is not only justified, but imperative. If, however, all precautions of asepsis have been followed carefully, and the solution which immediately after boiling was clear, assumes a pinkish shade attributable to oxidation, heat and light, it may be employed with impunity. The writer never has observed any toxic symptoms following the injection of sterile though slightly-discolored solutions. It goes without saying, of course, that dust, particles of saliva distributed in the air by breathing and speaking, or alkaline vapors from soap and sodium bicarbonate which ever pervade the air of an operating room, must be excluded by covering the dissolving cup with a plate of colored glass or of porcelain which is readily sterilized by passing the surface which comes in contact with the rim of the cup over an alcohol flame.

It has been observed that some operators fill their dissolving cup with Ringer solution, add the novocain-suprarenin tablets to the cold solution and boil. This procedure is reprehensible because the tablets come in almost direct contact with the flame at the bottom of the cup where they are roasted, as it were, long before the Ringer solution approaches boiling point. Such combined roasting and unduly prolonged boiling greatly impairs the clearness and stability of the resulting solution. If hydrochloric acid is used to overcome the alkalinity of ordinary class containers, great caution is advised not to over-acidulate, since intense and prolonged afterpain will follow injection of such solutions. Alkali-free glass containers are now readily obtainable.

DISTILLED WATER

The use of contaminated distilled water of the average drug store variety cannot be too severely condemned, as it is conducive to afterpain, sloughing and even suppuration as has been demonstrated by animal experimentation. The most satisfactory distilling apparatus is one of glass of the sort devised by Dr. Silverman and others. The first portions of the distillate always should be rejected, as it contains dust and carbon dioxid accumulated in the still. If any doubt exists in the operator's mind as to the absolute purity of the distilled water used by him, he should subject it to the simple tests prescribed by the U. S. Pharmacopoeia. The operator's stock of distilled water is to be kept in a double, ground-glass stoppered, non-alkaline glass flank covered by a hood of sterile gauze. Ringer stock solution can be kept sterile for weeks in the non-alkaline glass stock bottle designed by the writer, and illustrated in *Fig. 1*, into which air is admitted only through a wad of sterile cotton held over the small holes in the stop-cock and intake which are brought into line by a turn only when Ringer solution is actually needed. It is good practice to renew Ringer solution every week, sterilizing it in a water-bath after removing stop-cock and nozzle hood and protecting the two outlets of the bottle with sterile cotton or gauze. The necessity of bona fide freshly-distilled water becomes all the more evident in the light of our recent knowledge of protein anaphylaxis, and it is quite possible, in fact probable that most of the toxic phenomena observed by some practitioners are due to nothing but the patient's hypersensitivity to proteid cells contained in carelessly-prepared novocain solutions. Personal intolerance to novocain itself has never been reported.

TOXICITY OF NOVOCAIN-SUPRARENIN SOLUTION

A great deal has been said and written about the toxic symptoms produced by novocain-suprarenin solutions, and their appearance is usually, though wrongly, attributed to the admixture of suprarenin. Braun, and quite recently again Silverman, have conclusively shown that this toxicity is not due to the suprarenin but to the novocain itself. This is also borne out by the study of G. B. Roth, of the U. S. Public Health Service, who states that *"the depressing effect of novocain on the blood pressure and respiration of animals makes it necessary to use caution in its administration in clinical cases in which the blood pressure is low or in which the heart is at fault,"* and that *"great care should be exercised in the injection of novocain subcutaneously, in order to avoid entrance into the circulation, thereby increasing its toxicity."* In this connection it is advisable, however, to remember Mayo's timely warning, that animal experimentation is not conclusive proof, and that clinical observation in man alone can arrive at the truth which the test-tube brigade can only distantly sight in their experiments on frogs, rats, cats and guinea-pigs. The writer's own clinical observations tend to emphasize the advantage of a tablet of a higher percentage of suprarenin in the dental tablet *E*, giving the stimulating effect of that drug, over the lower percentage in tablet *T*, except in hyperthyroidism or patients with high blood pressure. The more pronounced and longer anemia

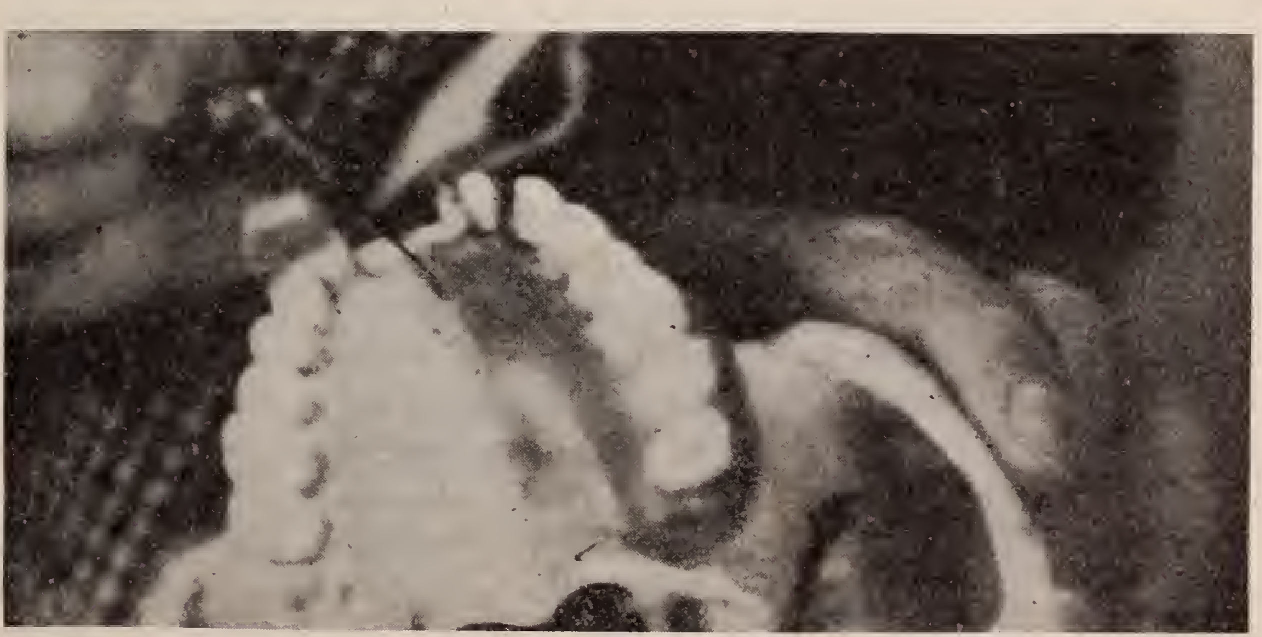


Fig. 11—Anterior Palatine Injection. The anterior palatine or incisive foramen is located in the median line back of the incisive papilla and emits the naso-palatine nerve, innervating the soft tissues palatally from canine to canine. The needle is inserted a short distance anteriorly to the incisive papilla, injecting under light pressure, advancing cautiously and slowly to a short distance posteriorly. Patient's head in reclining posture; mouth wide open. Quantity of solution, 0.25 c. c. or ⅛ contents of syringe.

produced by tablet *E* is of decided advantage to the oral surgeon in regard to better visibility of the field of operation. The disadvantage of this anemia as far as clot formation and wound healing are concerned, are fully overcome by manipulation, massage or scarification of the wound ensuring a free flow of blood before completion of the operation

Slow injection with just enough pressure to evacuate the syrings is the most efficient means for avoiding toxic symptoms which occur far more frequently in the infiltration of small quantities of solutions under excessive pressure, than in the deposition of incomparably larger quantities under practically no pressure in conductive anesthesia.

Both the operator's and the patient's individualities determine to a large degree the character and intensity of toxic symptoms which accordingly may vary from slight pallor to syncope. Proper diagnosis and selection of cases from physical, pathological, racial, social and psychic points of view are of paramount importance in the avoidance of untoward results. This phase of the question which may be summed up in the word *shock* has been treated in the writer's paper on "Anoci-Association in Dentistry," (*Dental Cosmos,* July, 1915), where the choice of anesthetic, pre-operative medication, and therapeutic measures in collapse are discussed in detail, also in *"Local Anesthesia in Dentistry"* under the heading of "Accidents Following Novocain Injections." As a primary measure of precaution, patients who are to be subjected to local anesthesia always should be specifically advised to eat a hearty meal previous to presenting themselves for dental or surgical operations. This precaution, which is contrary to our methods of preparing patients for general anesthesia, will practically eradicate all tendency to faintness.

The usual symptoms of toxic effects in the various types of patients may be briefly summed up as follows:

Weakly, anemic patients are prone to pallor and slight tremblings of the extremities which passes off rapidly upon deep breathing, or the internal administration of aromatic spirits of ammonia or camphorated validol, or upon the inhalation of strong ammonia or amyl nitrite, ethyl chlorid or ether. In *cardiacs,* distressing sensations in the heart region, shallow and rapid respiration and the appearance of perspiration on the forehead are noted, these symptoms quickly disappearing. The *bilious temperaments* seem to be most pronouncedly affected, but in these also as well as in advanced stages of *nephritis,* slow injection of 1 per cent. solutions and the operator's reassuring attitude help the patient rapidly across the first five critical minutes within which toxic symptoms usually appear. In persons with *high blood pressure,* the administration of mild narcotics previous to injection insures good results. Bromural "Knoll" (alpha-brom-isovaleryl-urea) 2 tablets equal 0.6 gram, to be taken with water 30 minutes before making the injection has given the writer greatest satisfaction, although other sedatives such as chloralhydrate, morphin in conjunction with scopolamin or hyoscin have their advantages.

In *neurotics or hysterics,* the problem is of course a much more complicated one, since we are dealing with psychopathic conditions, in the successful treatment of which the operator's personality in its appeal to the patient's psyche is a deciding factor.

Epileptics can be treated successfully if the operator will select the period halfway between the usually chronically occurring attacks. As a matter of gratification the writer wishes to state that in his clinical experience including every imaginable *bad risk,* he has observed but two disconcerting reactions in neurotics.

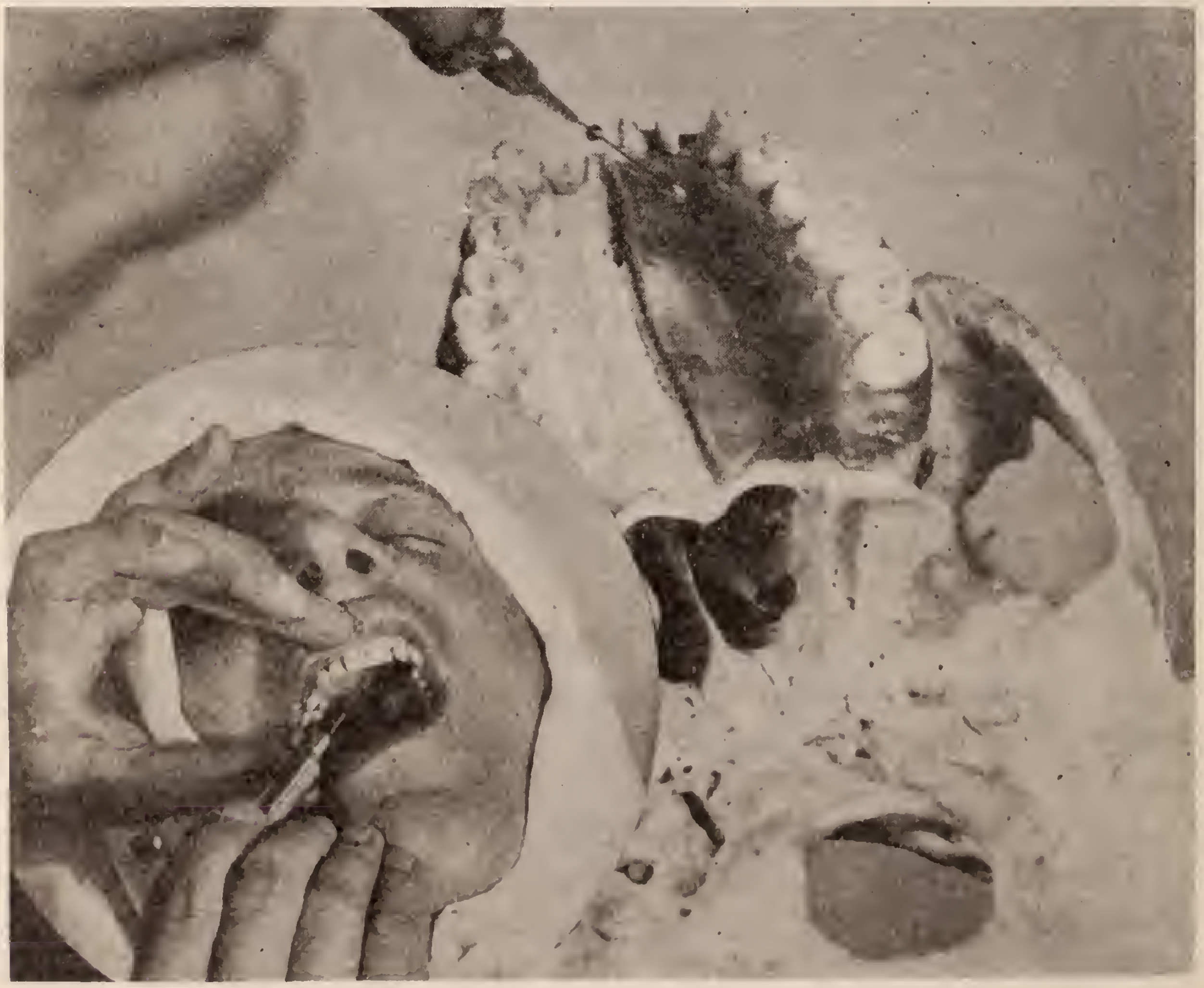
Children seem practically immune to both 1 and 2 per cent. solutions which, of course, is accounted for by the fact that usually the robust and healthy are the courageous ones who do not fear the needle, or that the operator by a few kind words striking the level of the childish mind gains the little patient's full confidence. It is remarkable indeed how devoid of any toxic reaction conductive anesthesia can be practiced on the children of the slums or inmates of asylums and tuberculosis institutions, whose physical condition is far below par.

Within 16 months of triweekly attendance as surgeon to the Depart-partment of Oral Surgery of the N. Y. Throat, Nose and Lung Hospital, and the same service as Attending Surgeon to the Dental Dispensary, Lenox Hill Hospital, N. Y. City, I have observed but one case of fainting in an undernourished and nervous girl of 15 years of age, faintness being due to unduly rapid injection and lasting but three minutes. Previous to that, I have had occasion to observe tendency to fainting in a hysterical young woman, Italian, 17 years of age, as Instructor in the Dental Department of the Medico-Chirurgical College of Philadelphia, and again as Instructor in the Post-Graduate School of Philadelphia in a man of 40 years who had made up his mind and signified his intention to faint.

INSTRUMENTARIUM

The necessity of asepsis of instrumentarium requires no special accentuation, although the lack thereof is one of, if not *the,* most common causes of afterpain and infections. Simplicity of instrumentarium engenders continuity of the delicate chain of asepsis, breaks in which are the more likely to occur the more complicated the apparatus used. All-glass-and-metal syringes without washers of any kind permit of most simple and effective sterilization. The liquid most suitable for keeping sterilized syringes is 70 per cent. alcohol with admixture of a small quantity of glycerin, which must be washed out from the inside of the barrel by drawing in it boiling distilled water several times to avoid the introduction of alcohol into the tissues, and causing unduly prolonged anesthesia of the injected area due to the well known action of alcohol on nerve tissue. Experiments with sterilizing fluids other than frequently-renewed alcohol have proven unsatisfactory. Formaldehyd solutions especially are contraindicated on account of their action upon novocain and the severe pain induced by the accidental subcutaneous injection of even minute quantities.

In the selection of needles, those of small lumen are preferable as a stout needle manifestly is more liable to cause pain and traumatism on introduction. The extremely disagreeable accident of breaking a needle which occurs most frequently in mandibular injections, is robbed of its terrors by the safety needles designed by the writer and illustrated in *Fig. 2*. These needles are constructed so that the break, if it occurs in vivo, comes to lie back of the safety disc which prevents the fragment from disappearing in the tissues. Iridio-platinum needles seem most suitable for private practice as they do not rust and are easily sterilized after every insertion by drawing through an alcohol flame, while steel needles clog unless a wire is inserted after every use, require at least

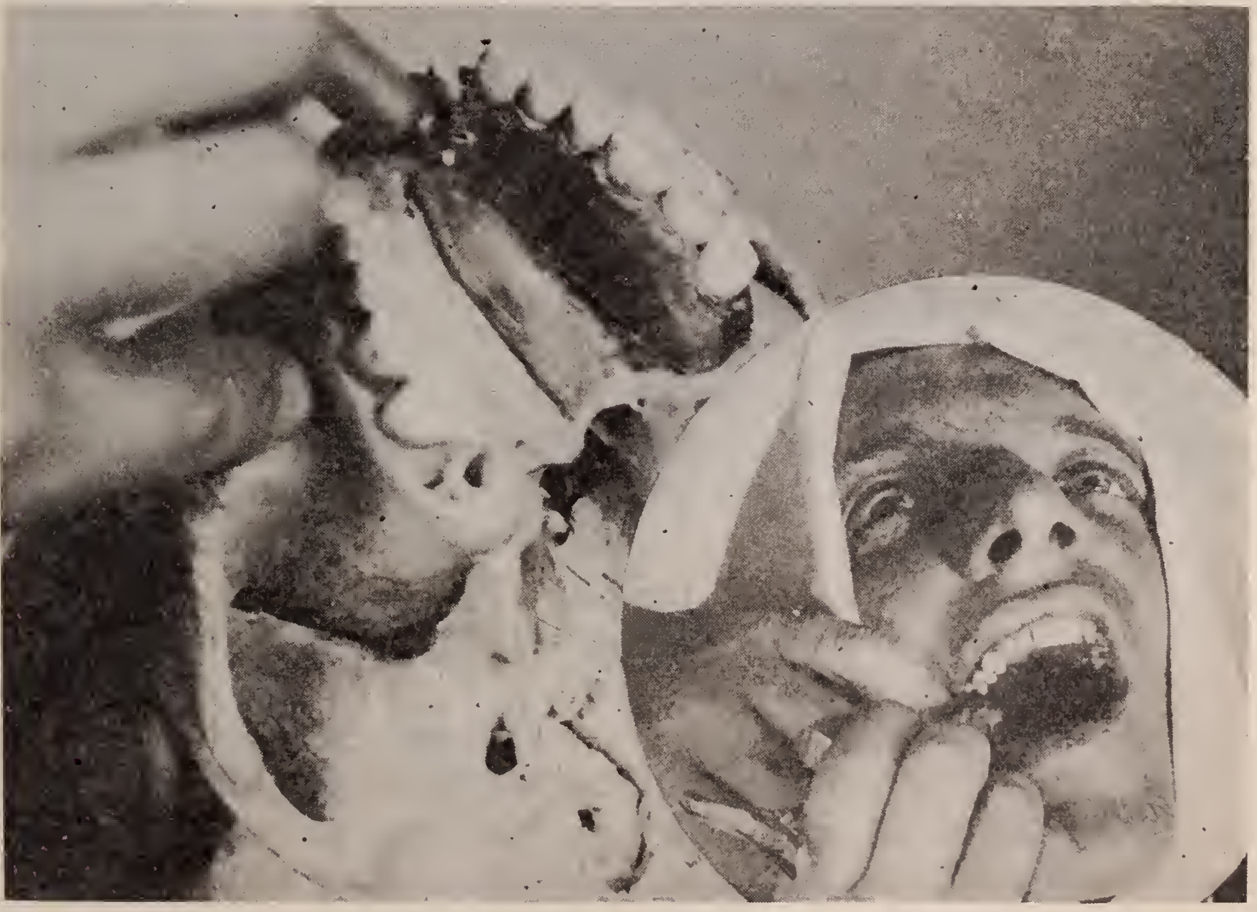


Figs. 12, 13—Infiltration back of lateral incisor. This injection usually is preferred in minor interventions to anterior palatine injection, because less liable to cause pain. The resulting anesthesia extends from median line to canine. Amount of solution, a few drops.

30 minutes' boiling to be sterile, and even then may rust and break anywhere along the course of the cannula. The sterilization of steel needles can be accomplished very quickly if instead of boiling, the needles are dipped for 30 seconds in a vessel containing molten Wood's or Melotte's metal. This method is based upon the argument that the needle is exposed practically to the heat of the flame in the absence of atmospheric air, thus preventing oxidation and loss of temper while destroying even the most virulent bacteria. The carrying of infections by needles from one part of the mouth to another or from mouth to mouth, is criminal negligence, and, it is to be hoped, of rare occurrence. The syringe and safety needles designed and used by the writer have given him and a large number of practitioners full satisfaction.

METHODS OF CONDUCTIVE ANESTHESIA

Although various attempts have been made by operators and teachers to attach their name to modifications of the technic of conductive anesthesia, it should be emphasized that all these modifications have been foreseen by Braun upon whose painstaking researches con-

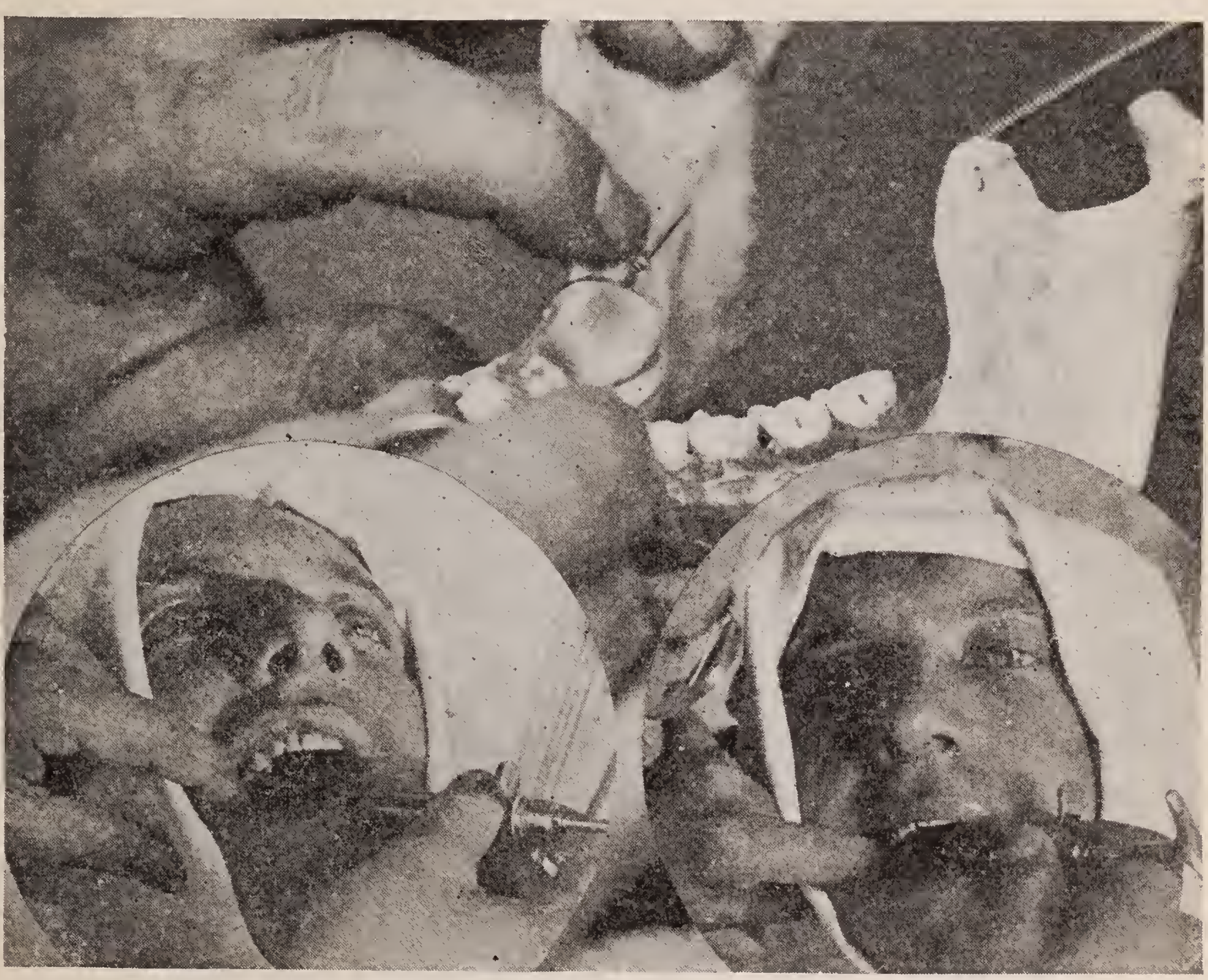


Figs. 14, 15—Left Posterior Palatine Injection. The posterior palatine foramen is located in the palate on a line joining the last molar teeth present; it emits the anterior palatine nerve innervating the soft tissues palatally from the third molar to the first bicuspid inclusive. The needle is inserted as for infiltration of the palatal root of the last molar, then advance slightly toward the foramen while discharging drops of solution. There is danger of going too deeply and directly into the foramen. The patient's head is in the reclining posture, mouth wide open. Quantity of solution, 0.25 c. c. or ⅛ contents of syringe.

ductive anesthesia is based. Since this basis is an anatomical one, there can be little variation or improvement over the basic principles established by Baum and adopted for dental practice by Fischer, Williger, Bunte, Moral, Seidel and others. It is feared that a confusion may arise in the beginner's mind as to specific merits of any one so-called method; in fact the many questions addressed to the writer in that respect seem to indicate that the confusion already has started which is surely not to the best interest of standardization which the dental profession is so eagerly striving to attain. The prime requisite for successful technic is a thorough familiarity with the anatomy of the head, and it is rather a slur upon the dental profession that certain *shot-gun* drugs are advertised as requiring no special knowledge of dental anatomy for successful administration. Not only should this familiarity with the anatomy of the parts concerned be acquired from general and special text-books, but practical experience on patients is paramount. Anatomic specimens are of great value, but better yet is the dissection of a green head after previous injection of some dye-stuff at the foramina concerned. In this manner the student becomes acquainted with the arrangement of the tissues upon which he is working.

ANESTHESIA OF THE UPPER BICUSPIDS

Reports concerning the extent of anesthesia produced by tuberosity injection seem to vary as widely as the opinions of anatomists regarding the course of the superior middle alveolo-dental branch. This branch, if it exists—and some anatomists claim it does not—may present the following variations in course. It is either given off from the large infraorbital branch within the infraorbital canal and runs from there in the mucosa of the maxillary antrum to the upper bicuspids without appearing upon the facial surface of the maxillary bone; or it is inserted together with the posterior branch at the cribriform plate; or it is inserted in foramina situated anteriorly thereto. The examination of numerous skulls and clinical observations tend to point out that the latter two conditions are present in at least seventy-five per cent. of cases. If the long needle is inserted in the reflection of the mucous membrane back of the distal root of the first molar, in other words, between first and second molars, and advanced on the bony surface, without discharging solution in an upward, backward and inward direction at an angle of about 45° with the masticating surfaces of the upper molars, and 1½ c. c. of solution are injected when the needle has been introduced to full length; if then in slowly withdrawing 1 c. c. of solution is discharged as the needle is withdrawn, thus leaving a deposit of solution from the cribriform plate to the reflection of the mucous membrane; then, the three molars and two bicuspids together with the soft tissues connected therewith are satisfactorily anesthetized. It is of little practical value to argue how this anesthesia is obtained. Suffice it to say that either the posterior and middle branches are blocked simultaneously at the cribriform plate or, if the middle branch is inserted in its own foramina anteriorly to the cribriform plate, it is blocked there as the needle is withdrawn, or if the middle branch descends within the antrum, enough solution penetrates the canaliculi in the cortical facial bone to produce bicuspid anesthesia. If the first bicuspid is only partly anesthetized, as happens in



Figs. 16, 17, 18—Right Mandibular Injection. The mandibular foramen is located in the internal surface of the ascending ramus, giving entrance to the mandibular nerve into the mandibular canal, innervating the soft tissues facially, the bone and pulps of all teeth from the third molar to the central incisor. Owing to anastomosis, if thorough obtunding of first bicuspids to central incisor is desired, the mandibular or mental injection of the opposite side must supplement. The external oblique line is palpated in the mouth and the tip of the index finger held in the retromolar triangle. The needle is inserted at the mid-level of the nail of the palpating finger above the masticating surface of molars in children and in old age somewhat lower, the barrel of the syringe resting on the bicuspid of the opposite side. The needle is advanced to full length before injecting. If the lingual nerve, innervating the soft tissues lingually, is to be obtunded, 0.5 c. c. or ¼ contents of syringe is discharged when the needle has entered the soft tissues half way. When injecting on the right side the operator stands in front of the patient; when injecting on the left side, the operator stands on the right side, his arm placed around the patient's head, the left index finger palpating the retromolar triangle. The writer prefers, however, to inject on the left side with his left hand. This knack is readily acquired and offers the advantage of easier access to and visibility of the oral cavity. In either case the patient is seated erect, the mouth wide open. Quantity of solution used, 2 c. c. or one full syringe.

some cases, this is due to the anastomosing fibres of the anterior branch. Most operators seem to insert the needle too far posteriorly and at too obtuse an angle, thus getting way beyond the cribriform plate, and yet not deeply enough into the spheno-maxillary fissure to block the maxillary branch in toto. Stern's suggestion of using the long needle in the bayonet-shaped hub has not given any better satisfaction. In all cases where the operator attempts an injection at a very obtuse angle a great deal of his solution seems to be deposited in the very heavy layer of areolar tissue overlying the cribriform plate and filling the spheno-maxillary fissure, so that very little solution is left for the nerve branches to conduct. This also will explain the observation of some operators who obtain only partial anesthesia of the first molar.

PAIN DUE TO INJECTION

Any pain caused by the insertion of the needle is directly attributable to faulty technic. The only tissues which may be sensitive to the passage of the needle are the mucosa and sub-mucosa. For the rest, the needle should advance slowly through areolar, soft, fatty and connective tissues which have no sensory innervation. The mucosa and sub-mucosa are rendered insensitive, at the same time sterilized, by the topical application of the iodin-menthol-benzol mixture suggested by the writer, (Iodin crystals, 10 parts; menthol crystals, 10 parts; benzenum U. S. P. 80 parts). This stable solution will not produce the sloughing following the application of ordinary tincture of iodin which must be not older than one week, else it will decompose into hydriodic acid, while benzol will preserve iodin indefinitely. This iodin-menthol-benzol mixture is also a valuable indicator as to whether a patient is suitable for conductive anesthesia. Nervous patients and children who object and utter complaints upon application of this solution which has a slightly smarting then cooling effect, are best subjected to a general anesthetic.

Another source of pain during the insertion of the needle which, it goes without saying, must be kept sharp, is scraping along the periosteum which is extremely disagreeable to the patient. Picking up of the periosteum by the needle point which is extremely painful is avoided in the novocain safety needle illustrated in *Figure 2* by the mark placed on the hexagonal hub in such a way that the operator is always able to determine whether the bevel of the needle which gracefully slides over the periosteum without engaging it, is in proper position, that is, the bevel of the needle pointing toward the bone, no matter how deeply the needle may be inserted in the tissues. Forcing the needle through muscular tissue causes a dull, yet pronounced enough pain. The infringement upon a nerve trunk is expressed by a very sharp, sudden and intense pain resembling the application of a cautery. As soon as any of these painful sensations arise, indicating that the needle is traveling on a wrong course, a slight withdrawal and subsequent alteration of the direction will immediately overcome resistance and start the needle on its painless way through the areolar tissue which causes the sensation of an advance into butter, while bone offers rigid, muscle and nerve tissue an elastic rubber-like resistance. The needle always must be manipulated during insertion in the manner of a slender probe enabling the operator's delicate sense of touch to determine at any stage what kind of tissue the needle is engaging. Operators who have for years practiced infiltration anesthesia exclusively are often in the habit of causing undue amount of pressure and jabbing which is extremely disagreeable to the patient and dangerous.

INFILTRATION

While on the subject of infiltration, it should once more be pointed out that this method is superannuated. The undue pressure employed in infiltration is liable to produce tissue lesions; the result in the lower jaw is disappointing; each tooth requires individual infiltration, opening up possible passages for infection; the periosteum may be ripped from the bone resulting in intense afterpain and possible necrosis; and most important of all the contents of a focus of infection hidden in the cancellated bone may be forced into deeper strata and the circulation and, revived by the ideal culture medium of Ringer solution, may act in the manner of an active bacterin leading to grave local and constitutional symptoms such as necrosis, osteomyelitis, cardiac disturbances, nausea, malaise and syncope. These risks are usually not present in infiltration on the palatine surface, where it is only necessary to infiltrate the soft tissues under pressure no greater than that required to keep the solution in contact with the tissues.

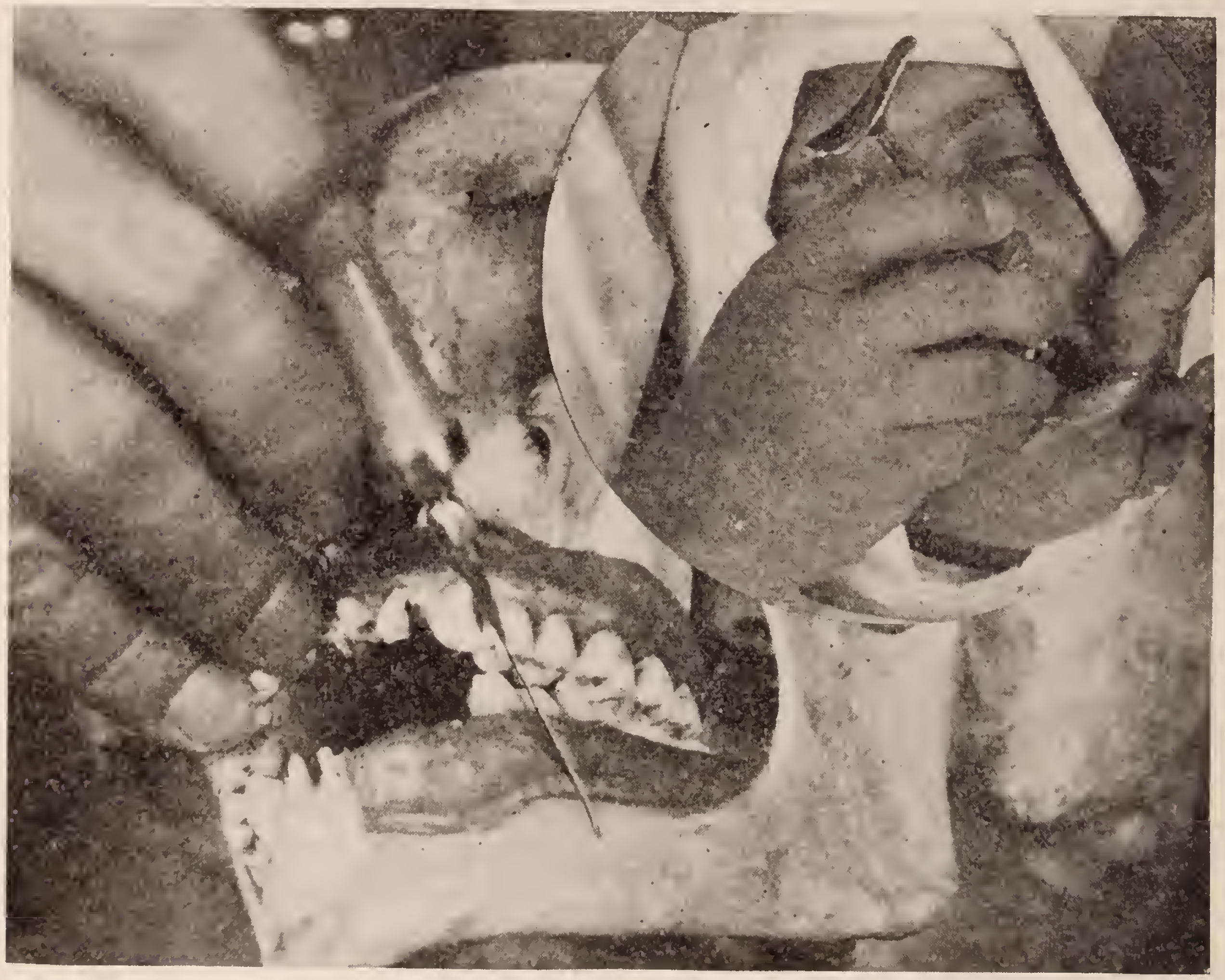
INFECTED AREAS

Areas which are not *bona fide* healthy are not suitable for injection. If in cases of infected oral mucosa a foramen can be reached by the extra-oral method, this method may be of great value if the patient will give his consent. As a rule, however, patients are laboring under the false impression generously fostered by the medical profession, that the interior of the mouth and its contents are the dentist's exclusive realm. All general infections of the mouth are an absolute contraindication to intra-oral injections. Pus carried by the needle to great depth may set up violent local and systemic intoxications and even prove fatal. Several such cases are on record.

FAULTY METHODS OF OPERATION

Before proceeding to operate, the actual establishment of perfect anesthesia must be ascertained by pressure or pricking, or, if indicated.

lancing with a suitable instrument within the area to be operated upon. If the slightest doubt exists as to the profundity of the anesthesia, comparison with corresponding non-anesthetized areas will give valuable indications. All anastomosing branches must be considered carefully, else the scalpel, curette, or bone forceps may suddenly invade an area in which sensibility persists. In mandibular injection the long buccal nerve, and in the lower anterior teeth the anastomosis from the opposite side must be considered and, if necessary, abolished by an injection in the region of the molars or at the mental foramen of the opposite side respectively. The pain incident to prolonged retracting and stretching of the lips and muscles is combated by a superficial injection under the mucous membrane of the cheek in the first molar region. In upper



Figs. 19, 20—Left Mental Foramen Injection. The mental foramen is located beneath and between the roots of the first and second bicuspids, where the incisor branch of the mandibular nerve innervating the bone and pulps of the first bicuspids (sometimes), canine and incisors, also the mental branch, innervating the skin of the chin, skin and mucous membrane of the lower lip, and anastomosing branches of the other side are blocked. Palpate foramen on face with the tip of the index finger, depressing lip with thumb. The needle is inserted in the reflection of the mucous membrane between the two bicuspids and advanced, while injecting, almost vertically downward; since the foramen opens distally, until the discharging fluid is felt under the palpating finger tip. Operator stands behind patient, who is erect, mouth half open. Quantity of solution used, 1 c c. or ½ syringe full.

anterior teeth the anastomosis from the opposite side is abolished by a transverse injection parallel to the masticating surfaces of the teeth half way between the gum-line and reflection of mucosa. The nasal branches are successfully anesthetized by the insertion of a small tampon saturated with 30 per cent. novocain solution upon the floor of the posterior nares. Neglect of these precautions may spoil the most beautiful surgical operation.

In the preparation of abutments or in the excavation of carious dentin the fact is often overlooked that the tooth, though anesthetized, is vital. Over-heating or too close encroachment upon the pulp-chamber will lead to painful results and irreparable damage to the pulp. Oral surgeons who have been used to operating under general anesthesia, had better relearn how to operate. Speed is absolutely no virtue under conductive anesthesia, the duration of which, for from one to three hours, is absolutely insured and permits of slow, deliberate, and beautiful operations. The manner in which the writer has seen some operators apply their forceps to a tooth or root is enough to frighten the patient forever, and the traumatism caused by speed-fiends is not prone to inspire the patient's confidence in conductive anesthesia.

OTHER UNTOWARD RESULTS

A certain amount of afterpain in many operations always will be unavoidable, as it is due to the traumatism caused by the operation itself and from which the tissues have to recover. Proper after-care, however, will successfully overcome this drawback. After thorough iodizing, wounds are dressed with novocain, anesthesin or orthoform powder in substance and tamponed lightly with iodoform gauze. If the edges of the wound are approximated by sutures, tamponing is out of the question, but the application of novocain powder in bulk upon the fundus of the wound will entirely prevent or greatly minimize post-operative pains. The frequent renewal of dressing is essential and, if the traumatic pain, despite all these measures, should be unbearable, the patient may be carried over the critical stage by injections of 1 per cent. novocain solution conductively. The resulting anesthesia greatly heightens the comfort and speed of the healing process. . As accessory treatment, ice-bags are applied for from ten to fifteen minutes, or the time-honored Prisnitz cold-water compress protected by a superimposed piece of flannel is employed to reduce inflammation. Violet-ray high frequency current also is very soothing and stimulates healing. Internally pyramidon in 5 grain doses is administered to insure relief and a good night's rest.

All other untoward painful results except those just mentioned are best overcome by prevention. Periostitis is avoided by avoiding injury of the periosteum. Pain and impaired function in muscle tissue is caused by perforation of this tissue and deposition of solution within this tissue which acts much in the manner of a foreign body. the absorption of liquids within muscle tissue being extremely slow owing to its poor vascularity. Absorption is hastened by massage and electric stimulation. Edema is due to overly-rapid injections and, if present, should be immediately distributed by gentle massage. Piercing of a blood vessel following unduly rapid advancement of the needle brings about the extravasation of blood into the connective tissues. The resulting clinical symptoms are those of a bruise or blackeye with tenderness and the gradual rainbow discoloration of the effused blood. The treatment is the same as that of blackeye, all therapeutic measures tending to stimulate absorption by heat and massage. Sometime an abnormal discoloration of the face is noted following infraorbital and tuberosity injections, especially in patients with flabby tissues. The face over the region injected becomes entirely white, color returning after a few minutes. This rather unsightly symptom is no doubt due to the action of the suprarenin upon the veins or the direct introduction into a small vein. Gentle massage will hasten the return of color. Emphysema is due to the introduction of air bubbles left in the syringe, and while involving no danger, is extremely alarming to the patient, and disfiguring. The patient's face

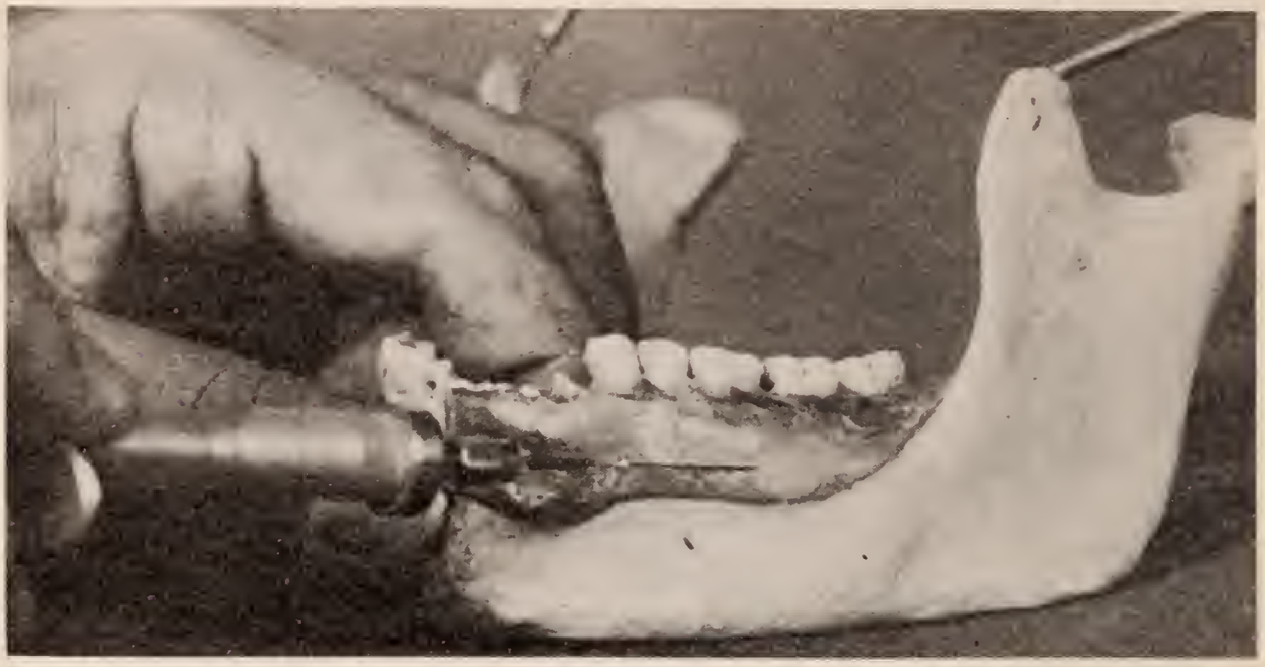


Fig. 21—Long Buccal Nerve Injection. The buccinator nerve, supplying the buccal mucosa of molars and bicuspids and angle of mouth with sensory fibers, is blocked as follows: the needle is inserted in the second bicuspid region, half way between the cervical margin and the reflection of the mucous membrane and is advanced parallel with the masticating surfaces of the molars, while continually injecting on the bony surface. Injection in the cheek, opposite the second bicuspid is indicated if prolonged operation is to be made, to avoid pain in the buccinator muscle from holding the mouth open a long time. Operator stands in front of patient, who is seated erect, mouth half open. Quantity of solution, 1 c. c. or ½ syringe full.

is puffed and attempts at aspiration of the air embolus are usually futile, as the embolus changes its position as soon as pressure is brought to bear upon it. Again stimulation of absorption is indicated as a therapeutic measure.

Unduly prolonged anesthesia follows either the accidental injection of alcohol, if the antiseptic solution has not been properly washed from the syringe, or the perforation of the neural sheath. Such surgical injury of a nerve is again best avoided by extreme caution in the insertion of the needle as has been pointed out above. Several cases of anesthesia lasting for weeks and months that have come to the writer's notice, have been due exclusively to a severance of a nerve trunk in the course of an operation, hence cannot be attributed to conductive anesthesia.

Hysterical spasms following several hours after novocain injections can be explained only by pre-existing nervous disease which could have been induced by any other irritation of the nervous system, therefore, they cannot be directly attributed to novocain.

Erotic symptoms belong to the same class of neural disturbances. They are observed far more frequently under general anesthesia, but may be elicited in highly-sexed patients merely by the presence or close contact of the operator. Their casual occurrence merely tends to accentuate the necessity of the presence of a third person at any operation no matter how slight, but especially when anesthetics are given. Erotic hallucinations in hysterias may occur upon seemingly trifling irritation, and it is the operator's duty to guard his patient as well as himself against medico-legal complications.

CONCLUSION

When we consider the thousands of injections of novocain-suprarenin which are being made in every large community every day without any untoward results whatever, the remarkable safety of this method of anesthesia is patent. Surely few operators would be willing or able to do without conductive anesthesia in their practices today, after they have once come to realize fully its incomparable advantages over older methods. A knowledge of the causes, however, of possible untoward results which may arise seems most desirable, and it is to be hoped that the teaching and practice of this method will be left to the fully competent, else dentistry may again, as it has happened with other methods before, be cheated out of the blessings of a doctrine which has proven itself to be a boon to humanity.

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FRACTURES AND DISLOCATIONS OF THE JAWS*

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GUNSHOT FRACTURES OF THE JAW.

THE METHODS OF TREATMENT of gunshot fractures of the jaws will not differ greatly from those used in civil practice. The principles of treatment will be the same. The only difference is that there are greater complications entering into gunshot facturs than into those met with in civil practice.

There will be greater laceration of the soft tissues of the mouth and face. which will greatly complicate the making of a correct diagnosis and prosecuting the necessary treatment. The bone itself will be lacerated universally and splintered into many fragments; and repair under these conditions will be delayed. Every case will present an infected wound, which will greatly interfere with the process of repair. Other factors will enter into the treatment of gunshot fractures, in war time, such as delay in instigating the treatment, which causes new problems to arise. Conditions make it impossible to treat many of these cases until some time after the injury.

In these cases frequently partial consolidation of the soft tissues has taken place. and large masses of cicatricial tissues have formed which greatly interfere with the reduction of the fracture, and makes it difficult to retain the fragments in normal relation. Not only does this condition hinder the reduction and treatment, but makes a clear and definite diagnosis difficult.

That pioneer in war dental surgery, Dr. George B. Hayes, of the American Ambulance at Neuilly, France, has formulated the following questions relative to the treatment of gunshot fractures:

**First:* The choice of disinfectants and the method of application.

Second: The various forms of bandages and contraindications for their use.

Third: The making of interdental splints.

Fourth: The conditions demanding immobilization of the mandible.

Fifth: The extraction of certain teeth of their immediate fixation.

Sixth: The means of overcoming trismus and treatment.

Seventh: The indications for bone grafting and choice of tissue to be grafted.

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Eighth: The relative advantages of different kinds of forces and means of application in the reduction of fracture.

These are some of the questions that are pertinent in the management of gunshot fractures of the jaws and must be taken into consideration before instigating the treatment.

In the treatment of these cases many different problems will be presented and the ingenuity of the operator in designing and constructing splints which will meet these problems will be a big factor in the success or failure of the treatment.

Major Jos. D. Eby, D.R.C., has designed a very clever method of treatment of gunshot fractures of the jaws which is simple, and designed to be used at the front when the advantages of a well-equipped dental laboratory are not available. The following is a description of this valuable method:

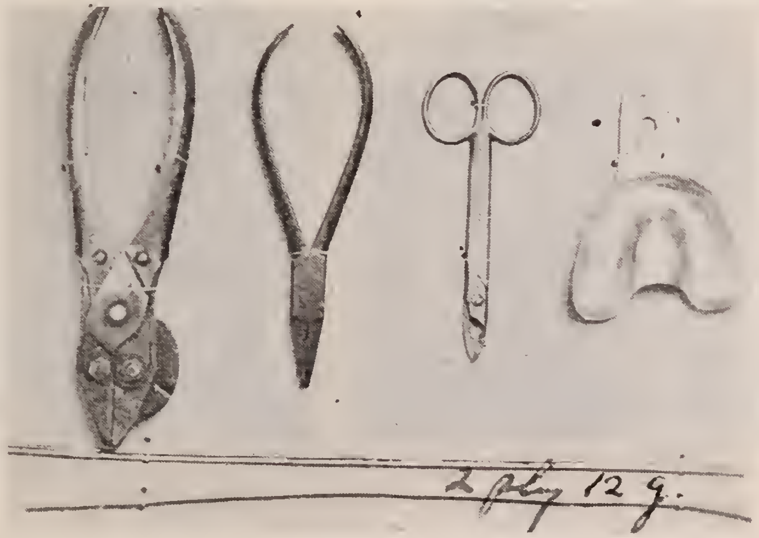


Fig. 54.—Instruments and materials for inside portion of splint, except modeling compound.

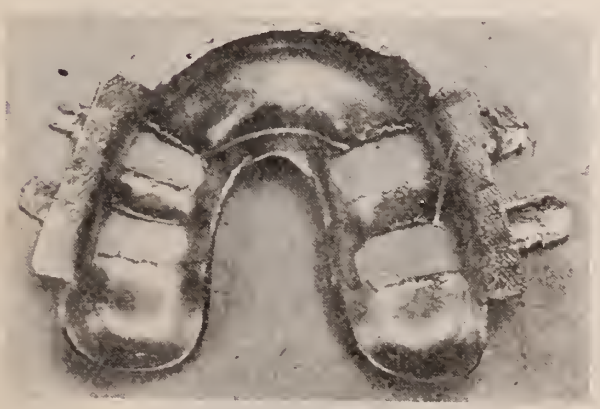


Fig. 55

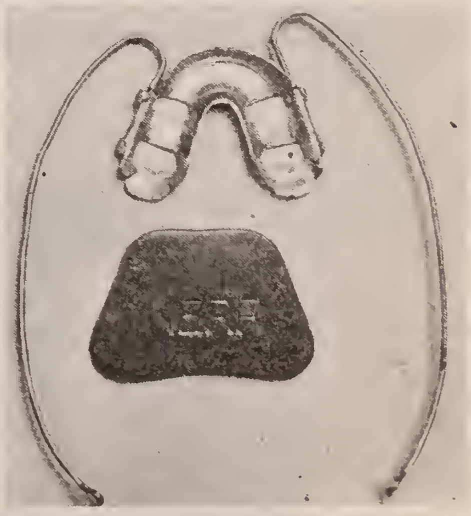


Fig. 56

Fig. 55.—Angle tray (preferably) with handle cut off, palatal portion cut out, labial border lowered and cuts made for buccal attachments.

Fig. 56.—Showing relations between tray and wires with buccal flanges and flaps conformed into tubes. Wires should not be bent until after the inner portion is all adjusted.

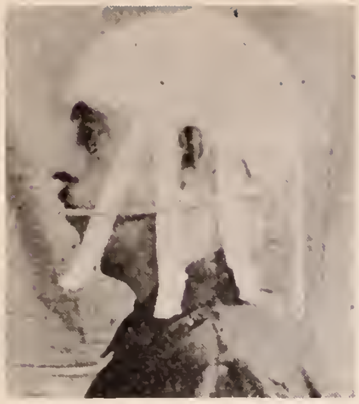


Fig. 57

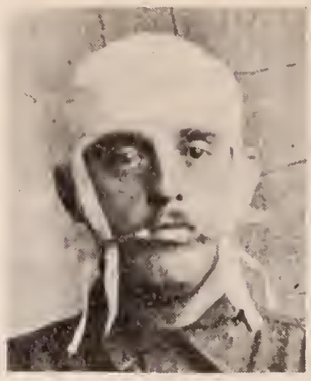


Fig. 58

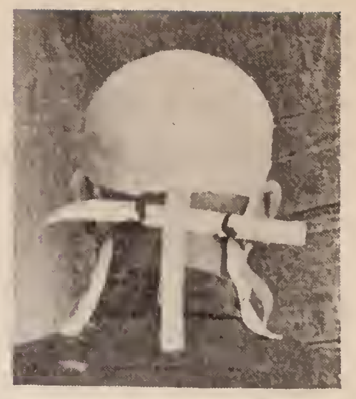


Fig. 59

Fig. 57.—Inner portion adjusted, wires in place, plaster bandage head-cap half completed, showing placement of strips for connections.

Fig. 58.—Anterior view same as Fig. 57.

Fig. 59.—Posterior view same as Fig. 57.

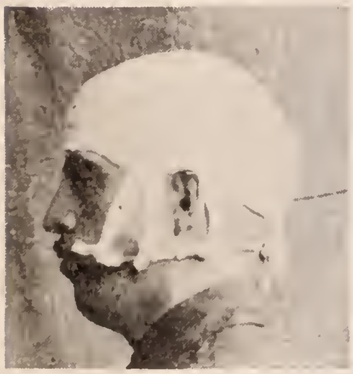


Fig. 60

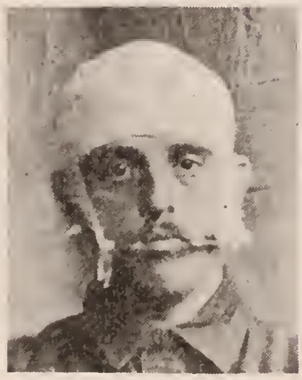


Fig. 61

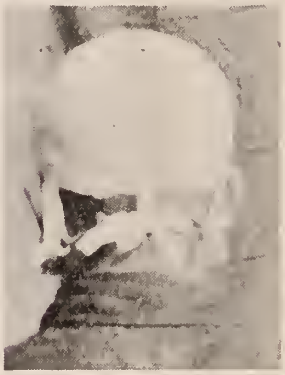


Fig. 62

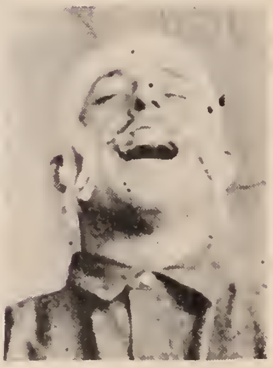


Fig. 63

Fig. 60.—Head-cap completed, side view.

Fig. 61.—Completed front view.

Fig. 62.—Completed rear view.

Fig. 63.—Illustrates the disassociation of all surrounding parts.

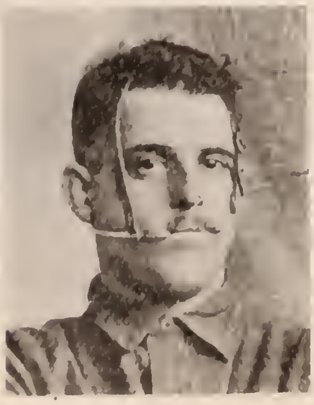


Fig. 64

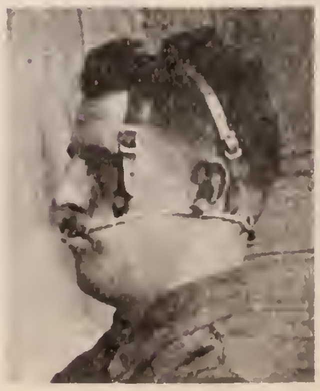


Fig. 65

Figs. 64 and 65.—Showing the use of leather straps; these should be padded.

Capt. E. Ballard Lodge, D.R.C., has designed a cast tin jacket splint, which has a practical application in the management of many of these cases of gunshot fractures of the jaws. Captain Lodge has kindly consented to summarize his technic and it is inserted herewith:

"Models of the teeth having been made and articulated upon an anatomical articulator, place warmed pink base-plate wax in such manner as to cover the crowns of the teeth to within a millimeter of the gingival margins both on the lingual and bucco-labial sides. The wax is to fit approximately only, not too accurately, since if it should so fit, it would be too difficult to apply the completed splint to the teeth. The gingival margin, bucco-labial, may be reinforced by an extra thickness of wax if thought desirable for additional rigidity of the splint. Impressions of the teeth from the occluding model should be made in the wax.

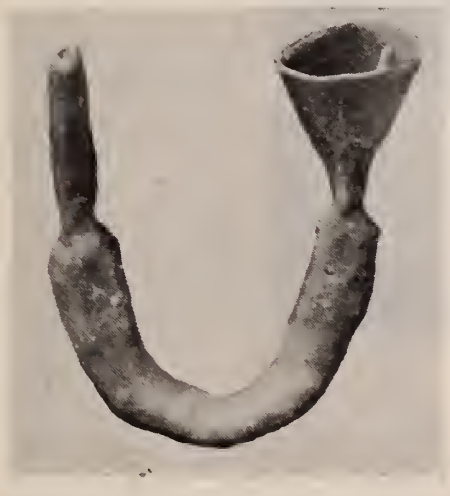


Fig. 66

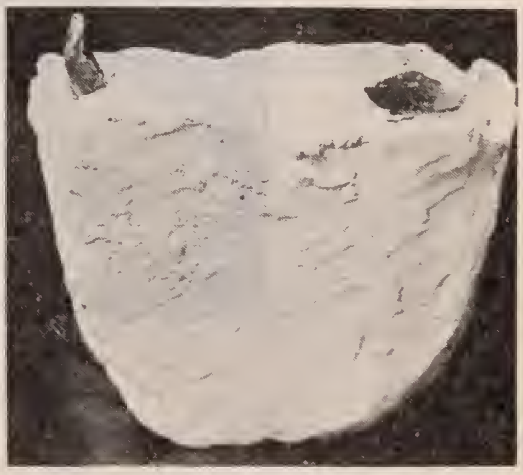


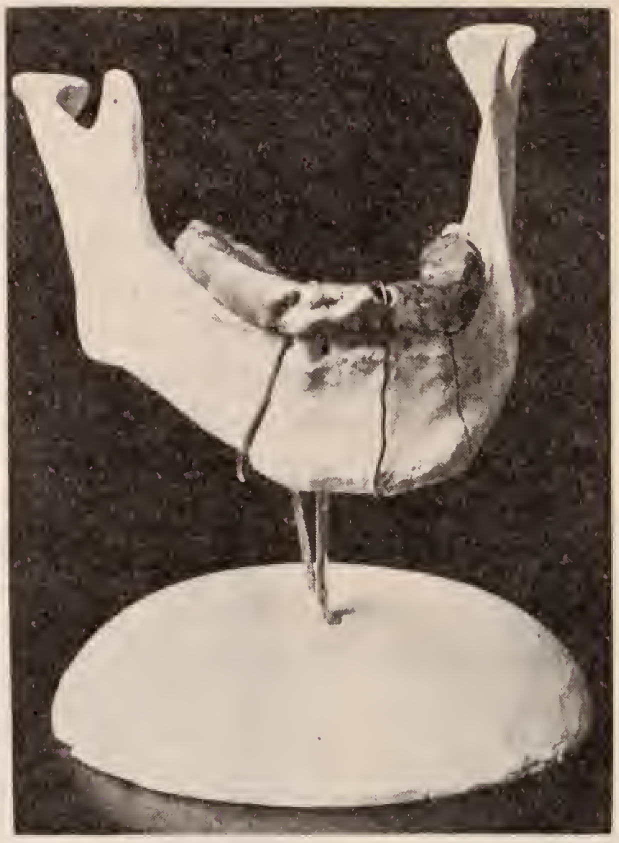
Fig. 67

"The pattern is now removed and a funnel of wax is fused to one of the heels of the pattern and a small cylinder or strip of wax is similarly fastened to the other end (*Fig. 66*), care being exercised to avoid distortion of the wax pattern.

"It is now invested in an investment of plaster of Paris and finely chopped asbestos (sold under the name of "Tenax"), equal parts. The funnel and the cylinder are, of course, to be left exposed at the top, as seen in *Fig. 67*.

"As soon as this has hardened, the whole investment is placed in a pan of water and the wax boiled out. It then may be heated by brush flame of blowpipe or otherwise to dry out. The resulting mold is now ready to receive the molten tin. Block tin is melted in a large spoon. This can be done over a large alcohol lamp if gas burner is not at hand.

"The metal is poured into the mold and will appear, when full, at the opposite side. A bench vise, if at hand, may be used to hold the mold while pouring the metal. Obviously, the funnel side of the mold should be on a level, or at least not below the side where the metal is expected to appear. In a minute or two the tin will have crystallized and may be placed in cold water. The investment being removed, the funnel and cylinder are cut off and any rough edges smoothed up with a file. (*Fig. 68.*)



Fig, 68

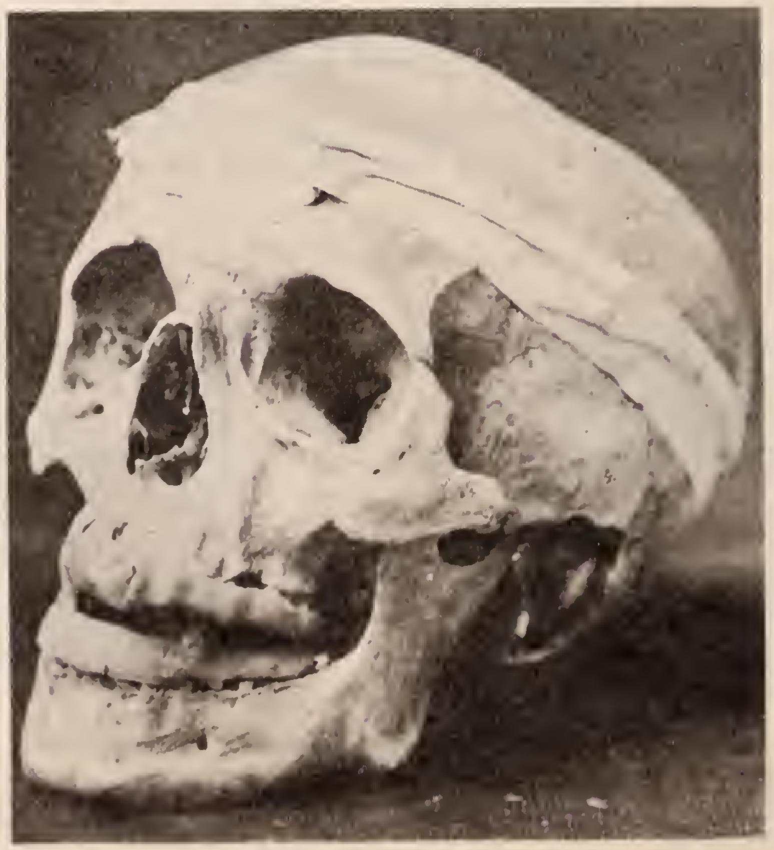


Fig. 69

"A block tin splint in the form of a Gunning splint may be used. This consists, merely, in two jacket splints, one for the upper and one for the lower teeth, properly related upon the anatomical articulator and united at the heels and at the cuspids, a space being left at the anterior portion for feeding. (*Fig. 69.*). To insure success, it is wise to have a good head of metal at the funnel end.

"Oxyphosphate of copper is to be preferred for cementing the jacket splint in place. This cement, unlike oxyphosphate of zinc, does not become foul. The oxyphosphate of copper being antiseptic, is better tolerated by the gums in event there should be some contact with the latter.

"The writer does not claim originality in the use of block tin as a material for the construction of jacket splints, but the fact of constructing same with one investment only may be new. Perhaps the greatest value of this method lies in the fact that an efficient splint can be made out in the woods and with few appliances in a very brief period of time.

"The writer has constructed a usable cast tin jacket splint for a lower jaw, inclusive of upper and lower impressions, making of plaster models, and mounting on the anatomical articulator, in fifty-three minutes."

(To be continued.)

ADDITIONAL DATA IN REGARD TO THE CAUSES AND PREVENTION OF DENTAL CARIES.*

BY W. H. O. MCGEHEE, M.D., D.D.S., CLEVELAND, O.

MACAULEY, THE HISTORIAN, has well said that. "Knowledge advances by steps and not by leaps." In no branch of science is this statement more applicable than in the field of Dental and Medical research. If it is true, as Washington said, that, "Knowledge is in every country the surest basis of public happiness," then I am convinced that a large part of the future public happiness of this great country of ours rests in the hands of the medical and dental professions; for happiness and health must go hand in hand.

We are in the midst of a great world conflict, the most gigantic and brutal war of the ages. The question of preparedness has been discussed by men and women in all branches of the nation's activities —preparedness for war and preparedness for peace after the stupendous conflagration is over. To my mind the most important and far-reaching phase of the entire subject of preparedness is that phase which deals with the question of the health of the nation—IT IS

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* Read before the Ohio State Dental Society, December, 1917.

PARAMOUNT. On it depends the entire future of the United States of America. In no manner can I more clearly state what I wish to emphasize in this connection than by quoting the significant words of Dr. Eugene L. Fisk when he says:

> "Who knows what we are facing as a nation in the years to come? One thing we do know—there is to be a struggle for existence, and the nation that is physically sound at the core is the nation that will hand down its civilization to the centuries. To study where we are weak, to study how we can make each generation a little better than the preceding one, instead of drifting with the tide of so-called natural evolution and trusting to luck that we shall not meet the destructive fate of all previous civilizations, to find out the facts about ourselves and our children and proceed to do our duty by our bodies and theirs by applying the lessons of science in the art of living; to accumulate health and vitality instead of disease and degeneration—these things I look on as simple elementary measures in preparation for either war or peace."

If we grant that these remarkable words are true (and who can refute them?) then it is indeed equally true that the medical and dental professions of this country have a necessary and all-important national duty to perform—and that duty is the education of the public to a higher appreciation of the importance of the daily application of the laws of personal hygiene.

WHAT IS DUTY?

Fisher and Fisk in "How to Live," have this to say in regard to the matter:

> "Certain it is that more people would practice hygiene if they could be made to realize in some vivid way how much they needed it. Few persons, even when they read and accept the statistics on the subject, really have a picture of the imperative need of hygiene as an integral part of every human life. It is not brought home to them how widespread is illness, how numerous are preventable deaths, how many are the tendencies toward individual and racial deterioration. The report of the Roosevelt Conservation Commission on National Vitality indicates

> that annually there are in the United States over 600,000 deaths which might be prevented, if existing knowledge of hygiene were properly applied; that at least half of the 3,000,000 and more sick beds constantly kept filled in the United States are unnecessary; that the financial loss from earnings cut off by preventable disease and premature death amounts to over $1,500,000.000 annually; and that over fifteen years are lost to the average life through the lack of application of knowledge which already exists, but which simply has not yet been disseminated and applied."

These statements are very significant and undoubtedly correct, but they would be of far greater value in the present instance if the important addition were made that of all the pathological conditions to which mankind is subject, the most widespread, the most rampant and far reaching in its influence is the condition commonly known as decay of the teeth. Hunter, Rosenau, and many members of the medical and dental professions are calling attention to the fact that numerous systemic derangements are directly attributable to mouth infections; it is well understood that many disorders of the digestive system are due to inefficient methods of mastication, while it is recognized that numerous reflex disturbances may be traced directly to the teeth. It is also an equally-significant fact, and a very important one, that most of these, in their last analysis, may be placed finally and directly at the door of the condition which we have under consideration—Dental Caries. The medical profession is making strong efforts to eradicate numerous diseases with which the human race has in the past been afflicted, and they are meeting with success in numerous instances. The continued marked prevalence of dental caries is a standing disgrace and a blot on the escutcheon of the dental profession. No longer should the average dentist find it necessary to devote the majority of his labors toward the preparation and filling of cavities of decay, but rather should his highest functions be devoted toward the continued education of the public as to the importance of the laws of right living, and the prevention of the conditions which he has, in the past, had to remedy, as well as possible, by the application of mechanical and surgical procedures.

Much valuable research work has been done in the last few years in an attempt to make clearer the causes and prevention of dental caries by such well known workers as Pickerill, Wallace, Bunting, Gies, Marshall, Howe, Prinz, and a host of others, and many phases of the subject have been made clearer through their efforts. It is to be hoped that additional investigators may become interested and that larger facilities may be afforded for this work, through the efforts of the better class of dental schools, toward the founding of research laboratories and the training of special workers in this field. A few of the dental colleges already have established research laboratories for the working out of the numerous scientific problems of the profession, and there is a crying need for many more.

INSTITUTE SEMINAR.

The excellent work of the Research Institute is to be highly praised, and the Seminar presented this morning was a revelation. The most intricate problem before us as a profession today is the unraveling of the mystery of dental caries. It is a mystery which is worthy of the steel of any of the gentlemen who presented the results of their labors this morning. May we not secure the increased interest of the Institute and of additional workers in this special field?

During the past few years it has been my privilege to make a number of contributions to the literature of the profession, in regard to the subject of Dental Caries. The first of these articles was read at the annual meeting of the New Jersey State Dental Association, at Asbury Park, July, 1915, and published in the *New Jersey Dental Journal*. Following this there appeared articles on the same subject in the *American Dentist* for September, 1915, and the *Xi Psi Phi Quarterly* for January, 1916. Later, additional data were offered at the annual meeting of the Tennessee State Dental Association at Knoxville in June, 1916, and the Florida State Dental Association at Atlantic Beach in June, 1917, which were published in THE DENTAL SUMMARY for December, 1916, and September, 1917, respectively. During the course of these communications I gradually have endeavored to establish certain basic principles, which I now wish with your permission briefly to review, in order that we may formulate a definite working basis from which we may further advance in the elucidation of the question under consideration. In addition, it is my intention to offer further evidences of the strength of certain premises previously made, in order that we may be in a better position logically to make some further deductions.

I now wish to offer the following tabulation, which is, to my mind, a rational exposition of the causes of caries of the teeth.

TABLE SHOWING FACTORS CONCERNED IN TOOTH DECAY.

A. Local Factors.
   1. Fermentation of carbohydrates.
   2. Formation of bacterial plaques.

3. Accumulation and putrefaction of proteids, affording a nidus for the localization of fermentable material and harmful bacteria.
4. Increased deposition of mucin, resulting in acceleration of plaque formation.
5. Excessive excretion of glycogen (fermentable) in the saliva as a result of faulty metabolism by the liver of carbohydrate foods, or of irritation of the pituitary body by reflex action from pathological dentition and similar causes.
6. Diminution in the amount of alkalinity of the saliva, the natural cleansing and acid-neutralizing agent.
7. Irregularities of the teeth.
8. Abnormal interproximal spaces and improper contact points, (natural or artificial).
9. Defective tooth structure from faulty union of enamel plates, imperfect deposition of calcium during the formative periods, cracks in or fractures of the enamel, hypoplasia of the enamel and dentin, and similar conditions.
10. Recession of the gums, exposing unprotected dentinal surfaces at the necks of the teeth.
11. Improper habits of mastication.

B. Systemic **Factors.**

1. Improper dietary: (a) excessive carbohydrate diet, accelerating glycogen formation, which finally reaches the saliva; (b) excessive consumption of sugars, stimulating the increased deposition of mucin; (c) improper nourishment of infants, (bottle fed), resulting in improper metabolism of calcium salts with resulting poor tooth-and-bone formation; (d) lack of lime-containing articles of food; (e) insufficient water in the dietary.
2. The sedentary life, resulting in lowered bodily vigor, anemia, leukaemia, digestive disturbances, malnutrition, faulty metabolism, acidosis, nervous exhaustion and similar disorders, with consequent lessening of the vital resistance of the entire body, including the teeth.
3. Lowered bodily vigor, from any cause, including inheritance and disease processes of any character, resulting in the production of poor tooth development during the formative stages, or of retrograde metamorphosis in the same organs during the later periods of life.

4. Affections of the ductless glands, resulting in (1) increased deposition of glycogen in the blood and saliva; (2) interference with calcium metabolism in the tissues of the body, including the teeth, (3) as well as other imperfectly-understood pathological changes.

The above table is in a way a partial summary of my conception of the etiology of the condition as discussed at length in my previous communications. Most of the factors mentioned are now accepted, but some of them have been denied as unfounded by certain investigators. It is my intention to offer additional evidence in substantiation of the claims I have made with reference to these disputed points. A careful survey of this table will reveal certain important considerations, viz:

First. That the active exciting causes of caries are to quite a degree the result of the failure on the part of the patient to appreciate the importance of the regular application of the ordinary laws of hygiene to the oral cavity.

Second. That many of the local factors are, however, not concerned with conditions of a purely local nature, *per se,* but are dependent on certain faults in the dietary.

Third. That three of the remaining local factors, viz: Irregularities of the teeth, abnormal interproximal spaces and recession of the gums are largely preventable or remediable.

Fourth. That the single remaining local factor, viz: Defective tooth structure, is the only one mentioned which is not directly under the control of the dentist.

If we admit that the above statements are true, then we will have to acknowledge that the odium attached to the continued prevalence of this condition, certainly as far as the local causes are concerned, rests on the shoulders of our own profession, because we are the individuals to whom the public and the State will eventually look for its eradication.

A glance at the systemic factors mentioned in the table will reveal the significant fact that the majority of these also are preventable, if we as a profession can secure the co-operation of the medical fraternity in the promulgation of an aggressive campaign, directed toward impressing on our patients the importance of right living and its intimate bearing on this condition. We are already in the early stages of a closer affiliation of the two professions in the solving of our mutual problems, and time undoubtedly will knit these bonds much closer. Some of the medical schools, realizing the importance of a more thorough knowledge on the part of their graduates of oral diseases, and their intimate relationship to disturbances in other parts of the body, already have inaugurated courses of lectures by prominent members of the dental profession on these subjects. The medical department of the University of Cincinnati has taken this advanced step with the opening of its present session, and this procedure, which ultimately will redound to the credit of both professions and result in untold benefits to the public, undoubtedly will be followed gradually by the other schools of the country. With a deeper knowledge, on the part of the medical profession, of oral conditions, and a more profund understanding, on the part of the dentist, of the intimate relationship between diseases of the tissues with which he has to deal and systemic disturbances (which undoubtedly will result from the recent broadening of the scope of the course in the dental schools), there will be brought about a unity of action and interest of the two professions, whose beneficial results cannot be overestimated.

One of the results of the present war will be a higher appreciation on the part of the laity of many dietary and hygienic errors, which have crept upon us unawares in our modern so-called civilized existence. The fact of the matter is that caries, in its last analysis is largely a disease of civilization—civilization as we have known it in the past, and a majority of the causative influences I have mentioned might be termed civilization factors. Prominent among these may be mentioned (a) diet, (b) heredity, (c) the sedentary life, (d) increased brain work, (e) neurasthenia, (f) lowered bodily vigor. Many phases of these conditions have been discussed in previously published papers, and it is not my intention to again enter into an extended discussion of them at this time. It is now conceded by many that decay of the teeth is not a disease in itself, but simply a symptom of general physical deterioration of the race. It is well recognized, of course, that the environment in which the teeth are placed plays a large part in the production of the condition, and certain prominent investigators are claiming that external environment is the only factor concerned, failing to recognize the fact that this is controlled largely by internal factors. The ability of the micro-organisms to form bacterial plaques is due, in quite a degree, to the presence or absence of mucin, as well as to other causes; the tendency to the accumulation, fermentation and putrefaction of carbohydrate and protein food debris is regulated, among other things, by the rapidity of flow and alkalinity of the saliva; the presence or absence of glycogen in the saliva is concerned because it is capable of fermentation; at the same time, all of these agencies are entirely dependent on the civilization factors previously mentioned.

DEFENSIVE ENZYMES NOT CONCERNED

In a paper read before the Massachusetts Dental Society, entitled, "The Therapeutic Efficiency of Oral Preparations," published in the

Journal of the Allied Dental Societies, and later in THE DENTAL SUMMARY for August, 1916, Dr. Herman Prinz makes the following statement, viz:

> "Very recently an hypothesis relative to definite defensive or protective organisms possessed or produced by nature to combat the ravages of dental caries has been promulgated by McGehee. This conception is based on the ingenious experimental researches of Abderhalden, who holds the view that disease processes primarily are regulated by defensive ferments. McGehee's conception is based on a misinterpretation of the Abderhalden theory."

I desire to say here, that nowhere, either on the public platform, in the class room or in any contribution to the literature of the profession, have I ever made such a statement. The only references to defensive ferments which can be found in any of my writings appear in an article on Dental Caries published in *The American Dentist* for Sept., 1915, and in the *New Jersey Dental Journal* for July, 1916. In the former instance, on page 1, paragraph 5, there appear the following words, viz:

> "Abderhalden and other investigators have promulgated the law that there are three factors controlling or regulating the progress of disease processes, viz: (1) external disturbances, (2) internal resistance, and (3) defensive substances produced by the organism (defensive ferments). The question of the presence or formation in the body of defensive enzymes as protective agents against the inroads of disease is still in its infancy, and what bearing it may have on caries is unknown. This being the case, it can be given only casual notice here. In a discussion of the causes concerned, then, it may be said at this point that those to be mentioned are capable of classification under one or the other of the first two general factors mentioned, viz: Either external disturbances, which in the question under discussion may be termed environment, or internal resistance, the latter of which presupposes the presence and action of the vital element."

In the latter instance, on page 257, paragraph 3 is found the following, viz:

> "I am heartily in accord with this statement of recognized facts, as well as with the position he (Dr. Prinz) and Abderhalden assume in regard to the three important factors controlling or regulating the progress, activity and character of disease processes, viz: (1) external disturbances, (2) internal resistance, (3) defensive substances produced by the organism (defensive ferments). The question of the presence or formation in the fluids of the body of defensive ferments is still in its infancy and is discussed at some length in Abderhalden's recent work on "Denfensive Ferments." If his premises are correct, we can readily agree that an entirely new field has been opened up in the domain of physiological chemistry and that we will have to admit that we are just reaching the border line of human knowledge with reference to a proper conception of the causes and treatment of pathologic conditions arising in the body."

As is now readily seen, in neither instance have I intimated the existence of any connection whatever between the presence or absence of defensive ferments in their relationship to caries production. Dr. Prinz states that he has satisfied himself that defensive ferments have no bearing on caries production. I have not yet satisfied my own self in regard to the matter, because I never have sufficiently investigated the proposition. Caries of the teeth, in the light of our present knowledge, is due to both external causes (environmental factors) and internal causes, the latter of which are very important and are largely concerned with conditions acting during the formative periods of the teeth, both in the prenatal and early post-natal stages, as well as throughout the life of the individual. External causes are largely wrapped up in the consideration of such questions as local environment, while the internal causes are more particularly concerned with such conditions as inheritance, diet, and the state of vitality and ability to properly perform their functions of the tissue cells of the body, these latter conditions being largely regulated or controlled during life by the remaining so-called civilization factors previously mentioned, viz: The sedentary life, increased brain work, neuresthenia and lowered bodily vigor from whatever cause.

VITAL RESISTANCE OF TOOTH STRUCTURE.

As will be noted, I made the statement that these internal factors operate throughout the life of the individual. This dictum can be accepted only when we recognize the truth of the hypothesis that vital teeth are capable of offering a certain amount of resistance throughout their periods of usefulness, to the inroads of pathologic processes. I now desire to offer the following evidence in support of this statement, viz:

First: The pulp is the formative organ of the dentin, and after tooth formation is complete it remains to furnish nourishment via the dentinal tubules to this structure. The dentinal fibrils are bathed in a serous exudate of living protoplasm, which is exuded from the trophic pulp. On the life of the pulp depends the existence and welfare of the teeth.

Second: The dentinal fibrils in some instances extend into the enamel. This is considered by some as an abnormality, but the condition is found frequently enough to be taken into consideration.

Third: When the tooth is subjected to abnormal influences, such as caries, abrasion, erosion, and other similar conditions, the pulp responds in the form of a vital impulse and interposes a wall of resistance against the attacking agencies in the form of a transparent zone, tubular calcification or secondary dentin. Hypersensitive dentin is also the result of vital action.

Fourth: These phenomena are never found in pulpless teeth.

Fifth: Clinical evidence demonstrates that de-vital teeth decay more rapidly than vital ones. The dentin loses its strength elasticity and translucency.

Sixth: When the pulp of a tooth is removed for any cause, the enamel is much more subject to cracks, fractures, splitting off from the surface of the dentin, and rapidly progressing caries.

Seventh: The enamel, dentin, and cementum are capable of staining, either from within or without, by staining reagents, and the rapidity of staining is much greater in dead than living teeth. The enamel is slightly receptive to staining agents when vital, but much more so when non-vital.

Eighth: Causch, Von Buest, Bodeker, Heitzman, Klein, Tomes, Abbott, Von Ebner, Andreson, Morgenstern, and others demonstrated the presence of living protoplasm in various forms in the enamel, indicating that this substance is not completely out of the pale of nutrition.

Ninth: Woods, Causch, Miller, Kirk, Gaskill, Hopewill-Smith, Burchard and others have reported cases of resorption of the enamel and dentin from within, via the pulp, which could occur only through vital action. In some of these cases the resorbed areas have later been filled in by new depositions, via the pulp.

Tenth: In pregnancy, rickets, osteo-malachia, and similar conditions, the bones and teeth are subject to retrograde metamorphosis and absorption of their contained lime salts, via the blood streams. The teeth are markedly more subject to caries in these conditions.

Eleventh: In sickness, convalescence, lowered vitality from any cause, the teeth are more subject to decay, regardless of the regular hygienic care which may be given them. The condition is due in many instances, especially in rickets, osteo-malachia, gout, and diabetes, to the fact that not only is the resistance of the vital protoplasmic contents of the teeth lowered, but also that in these conditions there is an excess of ammonium chlorid formed in the blood, which, reaching the vessels of the pulp, produces a dissolution or softening of the hard tissues of the teeth.

Twelfth: Black, to the contrary, Pickerill and others, have demonstrated a change with age, in the amount of calcium salts in the enamel, as well as a marked difference in the total amount in all of the tooth tissue in the so-called hard and soft teeth. This necessarily must be due largely to vital functions or activities.

A number of prominent writers have denied the possibility of the teeth possessing the power of offering any vital resistance against disease processes, and yet if one will pursue carefully the writings of these authors, he will often find qualifying statements in this connection. For instance, I will quote from Black's *Operative Dentistry,* 2nd edition, vol. 1, page 144: "Because of the fact that the teeth are vital, it has been contended that vital influences play a very important part in caries * * * Today, the vitality of the teeth is not regarded as influencing caries in any considerable degree. Caries progresses the same in teeth with living pulps as in teeth with dead pulps. Some thought decay was more rapid in teeth with dead pulps, others have disputed it; certainly there is no difference worth contention". Again, the same author, page 147: "Besides the sensory function, the dentinal fibrils have also the function of the maintenance of the integrity and qualities of the dentin. * * * There is a slow but distinct deterioration in the qualities of the dentin in pulpless teeth, which is too apparent to escape the clinical observation of a close observer of long experience. This especially becomes apparent in a careful laboratory study. The enamel is much easier to split off from the dentin in teeth that have long been pulpless. The dentin very slowly loses strength as compared with neighboring living teeth from the same or other mouths. It loses much of its translucency, loses elasticity, and becomes more brittle. The younger the person at the time of the loss of pulp, the more rapidly these changes occur". In *Dental Materia Medica and Therapeutics,* fifth edition, Herman Prinz, we find the following on page 281, "Immunity as referred to tooth structure is, in the strict sense of the word, a misnomer, as it is not bound up with vital phenomena. In a biologic sense, immunity indicates a state in which the living body resists disease. * * * In a tooth with a vital pulp, the writer holds the view that enamel is capable of carrying on metabolic processes to a limited degree. He is able to substantiate this claim by certain pharmacologic reactions, which, however, he cannot discuss at this moment. * * * The omnipresent surface colloids and the colloidal fluids present in the enamel in teeth with living pulps modify the process of decay. All teeth which are imperfectly calcified, on account of their lowered resistance will sooner or later decay, until relative immunity is established, in accordance with the imperative law of 'Survival of the fittest'."

Such conflicting statements as these may be found in the writings of other authorities, and to the mind of the impartial investigator they can be taken only as qualified admissions that the teeth *are* subject to constructive changes and retrograde metamorphosis, and are capable of vital resistance. Both of the above writers admit that the tooth possesses this biologic function to some small degree, but would apparently imply that it is so minute in amount that it is of no real importance in its bearing on the question of immunity or susceptibility to decay. If it is present in ever so small amount, however, it is necessarily an admission that *it is present,* and the establishment of that fact is the issue for which we are contending.

Additional evidences of the soundness of our conclusions may be found in a study of the teeth of the lower animals. Tomes classifies dentin found in the teeth of man and the lower animals into (a) hard or unvascular dentin, (b) plica-dentin, (folds or waves) (c) vaso-dentin (vascular) and (d) osteo-dentin (resembling bone). He claims that vaso-dentin, in which the canals are filled with capillaries from the pulp, is natural to some mammalians, such as the manitee-tapir, (Indian and American), and the megatherium, now extinct. It is common in many fish, such as the flounder, most flat fish, (pleuronectidæ), as well as in the ostracion and hake. According to Dewey and Thompson, in some instances only the point of the tooth of the fish is covered with enamel. These authorities also are responsible for the statement that in the sloth (a mammæ) the central axis is vascular dentin, while the outside investment is of harder dentin. Hopewell-Smith, in his "Histology of the Teeth", page 17, makes the statement that in the artiodactyla, the enamel occupies a position between the dentin and cementum. The same author in his *"Dental Anatomy and Physiology",* page 301, says that the enamel of marsupials is tubular and that the condition is an example of atavism. He also states that vascular dentin is common to the hake (merlucius) and osteo-dentin, to the esox-lucius. Tomes, in speaking of the enamel of some animals, states that the penetration of dentinal tubules into this tissue is characteristic of marsupials, with the exception of the wambat; that the same condition exists in some rodents (the Jerboa), as well as in some insectivora (saricidæ); that they are characteristic in the enamel of the kangaroo, and of the sheeps-head fish. Burchard also calls attention to the fact that Causch's tubes are found in the enamel of many of the lower species, especially certain fish, and that either vaso-dentin or osteo-dentin is normally present in many, such as the hake, cod, sargus, flounder, and haddock.

These instances are all sighted to emphasize the point that mother nature has, in a large majority of cases, made provision for the proper nutrition and continued vitality of most of the products of her handiwork, certainly as far as the lower order of beings is concerned, and that it is irrational to suppose that some such provision has not been made to take care of all the tissues of her most perfect piece of mechanism, man. If this be true, then the teeth certainly must be capable of a certain amount of vital resistance, since all living tissue possesses this property to a greater or lesser degree.

Arguing the question from a chemical standpoint will bring us to the same conclusion. When the pulp is removed from a vital tooth, a change of matter occurs in the tooth. In change of matter (organic or inorganic) there always is a change in chemical composition. In a non-vital tooth there is a continual chemical change taking place. The germs present in the mouth act more readily on the dead organic matter in the tooth than they do on living matter, while the acids of fermentation act the more or less rapidly and forcibly on the inorganic constituents of the tooth, depending on the frequency with which the latter are changing their molecular relationships.

(It is now recognized that the formation of a cavity of decay is due to a double decomposition, the acids of fermentation producing a dissolution of the inorganic constituents, while the ferments produced by certain micro-organisms digest the organic matter through the process of putrefaction.)

Whenever organic matter undergoes decomposition, the process generally is accomplished by oxidation, which causes a change in color. The organic matter is naturally the only part of the tooth which would undergo putrefaction, thus oxidizing the other elements, which turns the color. In vital teeth, only decayed areas and those parts immediately beneath them change color, whereas in non-vital teeth the entire structure changes color, proving still further that there is a change in chemical composition. Therefore, there being a decided change in matter and chemical composition in devitalized teeth and the agencies producing the dissolution acting more readily during the progress of such changes, there is necessarily greater susceptibility to morbid processes, including caries, under these circumstances.

I have dwelt at length on this question of vital resistance, because of its importance in the establishment of the wisdom of certain statements I now wish to make. It is self-evident that the routine local hygienic measures advocated by the dental profession for the prevention and relief of caries of the teeth are affording, in cases in which they are practiced conscientiously and regularly, some relief; but it must be acknowledged that they are really falling far short of the promise of any great amelioration of the effects of the condition on the great mass of the people. I do not wish to be understood as in any way minimizing the great work which has been accomplished in the past by the prophylaxis specialists, and which is still producing such marvelous results; it is worthy of the greatest praise. But I do wish to make the statement most emphatically that these measures must in the future be considered as only half-way measures. Local treatment may be considered as practically a failure, certainly as far as the stimulation of any hope of its ever being able to eradicate the condition from the human race. We must seek further means of relief, and these can be found only in the adoption of measures which will strike at the root of the systemic factors concerned.

So far-reaching are the effects of dental caries, that we will say that it is directly or indirectly concerned in the production or continuance of the vast majority of the ills to which modern man is subject. Inversely it also must be said, that a large number of human ailments are closely related to the production of these conditions. Their interrelationships are retro-active and cannot be separated. The raising of the health of the oral tissues and the elimination, as far as possible, of the diseases to which they are subject will result in the production of a higher physical, mental and moral standard for the race. The great work at present being done by the Preparedness League of American Dentists, in putting the mouths of recruits in order, will go far toward winning the war. It will be worth many hundreds of aeroplanes and tens of thousands of large-caliber siege-guns.

But, if the ravages and results of dental caries are to be controlled as a national health and efficiency measure, we must adopt not only local oral measures, but must, of a necessity, strike at the root of the evil and look as well to the important questions of diet and a general elevation of health standards. Our mode of living must be changed. The physician and the dentist must work hand in hand for the broadcast dissemination of an increased knowledge and recognition, among the masses, of the importance of the evil effects of lack of exercise and fresh air, of the contamination of the blood streams and tissue cells of the body by the toxins and poisonous products of deranged digestive organs and a clogged colon, of the ill effects of uneugenic intermarriage, and of all the other harmful results of disobedience of the laws of hygiene.

Since the publication of Dr. William Hunter's memorable indictment of septic dentistry, the literature of the profession has been flooded with discussions in regard to local septic foci, and their far-reaching influences. It is necessary to continue the agitation of that question for a while longer until every one can be heard, when we will then be in a position to leave it. The importance of reflex disturbances of the teeth and their bearing on the production of grave nervous and mental disorders recently has been renewed by Dr. Edward C. Kirk and others, who have sufficiently emphasized the matter. The time is now at hand when the profession should rise in its might and exert all the influence of which it is capable toward the removal of the sting of the serpent in our midst. This should be our next step. Shall we not take it? Before doing so, it is necessary that we acquire a broader vision. We must be brought to look far ahead into the future and to reach that state of mind and soul wherein we are enabled to work and live by a vision—and that vision is the vision of SERVICE. "Where, there is no vision the people perish."

2165, Adelbert Road.

DEATH OF DR. J. W. STAGE.

On Thursday, July 11, after many months of suffering heroically borne, Dr. Jesse W. Stage of Goshen, Indiana, passed from his earthly labors, leaving behind a friend in every one who knew him.

Dr. Stage was among the most lovable of men, devoted to his profession, which he used as an avenue of service to humanity.

He had practiced in Goshen for 20 years, and was about 47 years of age at the time of his death.

An adequate obituary will appear in our September issue.

SURGICAL TREATMENT OF EDENTULOUS ARCHES WITH FLABBY SOFT TISSUE FOR A PROPER FITTING PLATE*

BY DR. F. B. ATKINSON, BRUNSWICK, GA.

There are presented in dental offices cases for artificial dentures in which there are loose sections of gum tissue over the dental ridges which are due to excessive absorption of the alveolar process in the reparation of the arches during the period following extraction.

This condition seems usually to occur anteriorly on the upper ridge and in some cases is so excessive as to interfere materially with obtaining proper impressions and well-fitting plates, the latter not seating properly and the results being unsatisfactory.

It is the opinion of the writer that the only proper treatment of such cases is surgical, which operations ordinarily are not serious; it being necessary only to anesthetize the tissues thoroughly and remove the section with a bistoury, cutting from each side of the center of the ridge at an angle such that the incisions will meet on a line opposite the center of the excessive tissues; thus the section removed will be somewhat the form of a prism. This being done, the opposite sides of the wound are drawn together and stitches taken. If properly done, the tissues will heal within a few weeks and the ridges brought to a condition of firmness. Impressions may now be taken and plates made with that satisfaction which comes from proper technic for normal edentulous arches.

In an instance of a case treated by the writer the patient is now wearing her plate with much comfort, whereas several plates were made before the operation and all were unsatisfactory.

This is only a minor operation and with proper technic dentists generally should not hesitate to perform it.

Of course care must be used in sterilization and asepsis in every detail. Local anesthesia being sufficient, though general may be administered. Catgut or silk ligatures being used for the stitches.

There have been methods used for absorbing and reducing the soft tissue with preparations of iodin and with caustics, but the writer believes that surgical treatment is by far the most satisfactory.

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*Read before the Georgia State Dental Society, 1917.

WHAT CURRENT PRACTICES TEND TO FAVOR THE ESTABLISHMENT OF A CONDITION OF INFECTION IN TOOTH STRUCTURE AND PERIAPICAL TISSUE?*

BY HARRIS R. C. WILSON, D.D.S., CLEVELAND, OHIO

LET US ANALYZE the question assigned us. For a moment we will reason backward from the effect to the cause.

First: What constitutes a condition of infection in tooth structure and periapical tissue? *Dorland's Medical Dictionary* defines infection as "The implantation in the tissues of the body of living pathogenic organisms in such a way as to favor their growth and permit their toxins to injure the tissues."

Second: What condition of the tissue in question immediately precedes that of infection? To this we answer, the condition of irreversibility, that is, a condition of excessive fatigue of the cell to a point beyond which it will not reverse and again become normal.

Third: What causes such a condition? To this we answer, excessive irritation of the tissue from any cause.

Let us bear in mind that the living animal cell is very delicate and will not tolerate an excessive prolonged irritation.

However, hold fast to the fact that the normal healthy tissue possesses much power to attack micro-organisms and to destroy them if they are not present in too great number; but tissue with low vitality has thereby lessened power to attack and destroy these organisms.

With these thoughts in mind we feel that the normal tissue at the root apex will dispose of many micro-organisms, but we cannot expect to maintain a healthy condition at the root apex if we irritate unto death the peridental membrane surrounding the apex of a root, thereby depriving the cementum of its blood supply which leads to the development of an area that is a choice incubator for the pathogenic guests.

Having recognized in past years that pathogenic organisms, such as streptococci, were one of the essential factors in producing infections, we made great effort to find an agent that would destroy the unwelcome visitors. We have given too little consideration to the effect of the agents we use upon living tissue, but have sought the one object of destroying micro-organic life. We believe we have with our agents often created a condition at the root apex that was more favorable to infection than already existed when we started treatment.

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*Presented before the Ohio State Dental Society, Cleveland, O., December 5th, 1917, as a part of a Seminar.

This brings us to a statement of the answer to the question assigned as our part of this Seminar, "What Current Practices Tend to Favor the Establishment of a Condition of Infection in Tooth Structure and Periapical Tissue?"

There are certain practices common in the dental profession that must be condemned in the light of our present knowledge. In my judgment one great offender against the health of the root apex is formaldehyd. Formaldehyd is, perhaps the most effective germicide we know; therefore it is not strange that we came to depend upon, and do yet depend so largely upon it as a germicide in cases where infection of tissue already exists.

Formaldehyd will destroy micro-organisms effectively, but unfortunately it also destroys the normal living cells.

Many of us have been convinced in our own minds that formalin *sealed* in root canals of human teeth destroyed the micro-organic life in the pulp canal and surrounding dentin; and furthermore we have more recently become convinced from clinical evidence that something was causing periapical infection even in the presence of a sterile pulp canal.

From clinical observation it is usually very difficult to definitely say that an abscess is from any one cause, for we must admit the possibility if not the known presence of infection in the pulp canal, together with the use of arsenic, formalin, or strong mineral acids in the treatments used. In some instances all of the above have been used.

Some may criticise the use of dogs for experimental purposes in the laboratory, but few of us are bold enough to use human beings for these experiments; therefore for the present we will give heed to the findings with dogs as our patients.

As it seemed reasonable to lay the destruction of certain tissue to the destructive action of formalin, Dr. Carl J. Grove, of St. Paul, attempted a series of experiments, using more than fifty teeth (dog teeth) which were treated in the following manner in an effort to determine the effect of formaldehyd upon periapical tissue in the presence of septic pulp tissue:

The dogs were anesthetized with ether, and to produce a putrescent pulp or septic root canal the pulps were removed and deliberately infected with pus from an abscess, then returned to their original canals, sealed with cement and allowed to remain for one week.

To provide control specimens both right and left first, second and third incisors were thus treated. At the end of a week the right incisors were treated with formalin which was sealed with cement and allowed to remain three or four days, this treatment being repeated two or three times.

The dog was killed and sections prepared of these teeth which showed, where formalin had been used, the liquefaction of the peridental membrane and areas where it had become detached from the cementum.

It should be remembered that when the peridental membrane is detached from the cementum there will never be a re-attachment at this point. This detachment necessarily leads to the death of the cement corpuscles in the cementum, as they are deprived of food, which in turn produces in the cementum a most favorable area for the development of infection.

Some may criticise Dr. Grove for using young dogs with definite foramina; but Dr. Grove has informed me that the foramina in the teeth of these dogs were not unduly large; however, the injury to the periapical tissue may have been more extensive than would have been in the average human case. We must concede that it does not require an extensive area of dead cementum to form a focus of infection where micro-organisms are deposited in such a favorable area.

Personally, I am satisfied that the *sealing* of formaldehyd-yielding preparations in a pulp canal is one thing the dental profession should discontinue, and I trust you are all of the same opinion.

Understand me clearly, the *sealing* of formaldehyd as opposed to bathing the pulp canals with formaldehyd when the crown remains open to the atmosphere.

For details of the effect of formalin, please read articles by Dr. Carl J. Grove, November, 1917, *Journal National Dental Association;* and December, 1916, *Cosmos*, which will furnish much enlightenment on this subject.

Another drug that must be given consideration here is arsenic trioxid, commonly called arsenic. We all know that the other fellow sometimes fails to seal his arsenic dressing and the result is an uncomfortable time for both patient and operator. The soft tissue and the bone adjacent to the tooth from which the arsenic has escaped is destroyed if the dressing leaks even ever so little. Now what must happen to the tissue just beyond the apex if we succeed in devitalizing the pulp in the canals? Will not the periapical tissue be so poisoned and irritated by the drug that death of the peridental membrane is sure to follow? Death of the membrane means loss of blood supply to the cementum. The cells of the cementum deprived of blood supply, that is, food, will die; leaving an area of dead tissue soon to be the habitat of pathogenic micro-organisms, arriving by way of the blood stream, if from no other source.

In two cities experimentation with arsenic is now being carried on to determine the effect of arsenic upon the peridental membrane and we shall await anxiously the reports of these men. But, in the meantime, with the knowledge we already have of the vital influence of an excessive irritation to the peridental tissue, are we not warranted in discontinuing the use of arsenic upon pulp tissue?

We have all experienced difficulty in reaching the apices of many roots and have resorted to strong mineral acids to dissolve the calcium salts of the dentin, thereby permitting the enlargement of the canals to and through the apex. Recent microscopic observations have revealed to us the fact that many, perhaps the majority, of root canals have two or more foramina. Now, if we succeed in entering one little canal leading from the pulp canal through the cementum at the apex and enlarging the same and filling it just to the end in an ideal manner, very well; but how about the other foramin or foramina which we do not enter? It or they remained unfilled.

Suppose we so enlarge the opening at the apex that we include all the minute canals from the pulp canal through the apical cementum, then we have necessarily destroyed some peridental membrane which may lead to infection. We will all agree, I believe, that it is not a putrescent pulp, *per se,* that causes periapical infection, but the destruction in some one of several ways of certain periapical tissue. This destruction may be mechanical; by an overwhelming multitude of microorganisms, or, I believe, more often by chemical destruction of the peridental membrane. We must discontinue destroying healthy tissue at the root apices.

While my subject calls for a presentation of methods that are injurious and therefore to be avoided, we feel it proper to say a word regarding a method of treatment that holds some promise of relief. While we do not in any way claim that the deposition of metallic silver in a sterile canal will restore lost peridental membrane, or restore to life and health infected cementum, it does seem reasonable that the method suggested by Dr. Percy Howe, of Boston, and described in September, 1917, issue of the *Cosmos,* may prove satisfactory in some cases.

In the clinic tomorrow morning we will present the technic of applying the metallic silver and show you the depth to which it is deposited in the dentin, done in the presence of a strong formaldehyd solution which is *not sealed* in the tooth.

In preparing to present these brief and simple remarks we sought to pretty well review the literature on the subjects considered, and regret to say that the real scientific work published is almost nil. Would there be any subject of greater value to the dental profession at the present time than a knowledge of the action of some of the drugs mentioned upon both vital and non-vital tissue?

We hope our Research Institute will help us in this matter. If it is your wish that this be done, write a letter to Dr. Price and ask him to have inaugurated such experiments.

Schofield Building.

COMPARATIVE DANGERS AND AVAILABILITY OF NITROUS OXID-OXYGEN ANESTHESIA*

BY JOHN R. McCURDY, M.D., PITTSBURGH, PA.

PERHAPS it were just as well at the beginning of my remarks to state that I am firmly enlisted in the ranks of nitrous oxid-oxygen advocates; that I am fully convinced that, with the best modern apparatus, in the hands of an anesthetist of experience, it is today the best anesthetic agent available. No anesthetic is safe in inexperienced hands and the best results cannot be expected without good armamentarium.

But in order to disarm any prejudice that might influence the present discourse I have approached the subject negatively, so to speak, seeking facts and testimony that tend to argue against its value and safety. Necessarily, I will be guilty of repeating many things that have been published by other contributors and investigators, but only, I trust, by those of recognized authority.

Since my subject comprehends primarily a comparison of anesthetic agents let us clearly understand what is the criterion. The vast majority of professional anesthetists will agree that the *best anesthesia* is that which is least harmful to the patient—immediately and remotely—and the *best anesthetic* the least harmful agent; for all anesthetic agents are poisons, and in some degree injurious to the economy. I say, advisedly, the majority of anesthetists, for there are all too many surgeons who consider that anesthesia best which will enable them to operate with ease and convenience, and in the shortest possible time, sublimely indifferent to any injury done the patient.

What are the dangers of anesthesia? The gravest one, and the only one considered by the laity and by some operators, is *death during administration*. How, then, are we to compare nitrous oxid-oxygen with other agents in this regard? You answer by quoting from your favorite statistician the number of deaths per thousand administrations of *gas,* ether, and chloroform. Personally, I attach very little importance to anesthesia *statistics.*

MORTALITY

Mortality statistics, as usually published, are unreliable evidence, because they are enumerations, compiled from bald records at scores of distant sources, of deaths occurring under this or that anesthetic, *assuming* that these deaths were *caused by* the specified anesthetic agent. How many of them are due solely or in part to unskillful surgery; to surgical accidents; to faulty technic; to lowered resistance; previous shock or moribund condition of the patient can never be known. We all know that many *so-called anesthetic deaths* are partly or wholly due to other causes and conversely many postoperative deaths are credited to various other causes which are at least partly due to the anesthetic. We need not suspect the honesty of statisticians or of anesthetists who report their results. But unquestionably the personal element, together with the impossibility of obtaining exact detailed information of every administration of a comparable number of cases of the different anesthetics to be compared, render statistics inaccurate. But if you accept the evidence of statistics alone as conclusive the case of nitrous oxid-oxygen is won at the start, for all authoritative statistics show it to be responsible for the lowest mortality rate and therefore the *safest.*

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*Read during the Joint Meeting of the Interstate Association of Anesthetists and the Mississippi Valley Medical Association, Toledo, O., October 9-11, 1917.

It would be a useless waste of time for me to quote at length, published statistics of the many reliable investigators to which you can all refer at your leisure. The statistical work of Miller in *The Year Book* (1915-16) is perhaps the most exhaustive and reliable, as well as the most recent authority on the subject. From it we learn that the approximate relative mortality under various anesthetics is about as follows:

Nitrous oxid-oxygen: 1 in 13,000 to 35,000.
(*If dental administrations are included, and the use of nitrous oxid alone and with air, the rate is as low as* 1 *in* 1,000,000.)
Ether: 1 in 4,500 to 55,000 (average 1 in 8.010).
Chloroform: 1 in 1,300 to 3,200 (average 1 in 2,665).
Ethyl Chlorid: 1 in 1,800 to 13,300.
Spinal Anesthesia: 1 in 158 to 800.

Our discussion has to do, of course, with nitrous oxid-oxygen anesthesia. The day of nitrous oxid alone is past except for very brief anesthesia or analgesia. Pure nitrous oxid—and it is only in quite recent years that chemically pure nitrous oxid, free from poisonous by-product, has been obtainable—pure nitrous oxid without oxygen, or even with uncertain quantities of air, is undoubtedly a dangerous drug. Yet Frederic Hewitt in 1907, after careful search of both medical and dental literature covering a period of 40 years (1860-1900) and personal inquiries in addition, was able to collect records of *only 30 fatalities*, and himself classifies 10 of these as doubtfully or not at all due to the anesthetic. He further asserts "It is now universally admitted that nitrous oxid is the safest general anesthetic known when administered with a proper percentage of oxygen * * * its inhalation is practically free from risk to life. Even when pure nitrous oxid is given by one familiar with its use the risk to life is so slight as to be almost negligible. So far as the author is aware no fatility has yet (1906) been recorded under nitrous oxid and oxygen." Such testimony by one of the leading authorities of the world must certainly carry weight. But is it not reasonable to believe that in the past ten years nitrous oxid-oxygen anesthesia has been rendered still more free from risk by improved methods of manufacture and vastly improved apparatus? It is a lamentable fact, however, that a considerable number of fatalities under nitrous oxid-oxygen have been reported in the past few years and some of us may know of others that have not been reported. Why is this? The gas itself as produced today by reliable manufacturers is surely not less pure than the product of ten or fifteen years ago, and appartaus is far better. The reason may be found in an article by Gwathmey in the *British Medical Journal* of March 24, 1917. He says "* * * while the latest available statistics give first place, as regards life, to nitrous oxid-oxygen, yet so many deaths have been reported from time to time, *since the more general use* of this combination that we are forced to the conclusion that it is not as safe as is generally supposed, *at least with our present methods of administration.*"

I do not think that the usual proper methods of administration as understood today by competent anesthetists are at fault. But the recognition by surgeons in recent years—through their own investigations and their education by anesthetists and *not* through advertising—of the superior value of this anesthetic has led them to become perhaps, overenthusiastic, and to place it in the hands of untrained anesthetists who have administered it with overconfidence and even recklessness. Another mistake that has no doubt led to fatal results is the *pushing* or forcing the gas in the effort to secure greater relaxation by deeper anesthesia. Nitrous oxid-oxygen has its limitations as does any other anesthetic and these must be respected. The admixture of oxygen must be constant and in sufficient percentage—be it 4 or 24 per cent.—to prevent jactitation and cyanosis beyond a slight purple or rose color.

Granting that the physiology and pharmacology of nitrous oxid is still *sub judice,* the fact obtains that death is apparently due to asphyxia or a physiological complex that is indistinguishable from asphyxia, and this can be prevented by sufficient oxygen and free, unobstructed respiration.

RESPIRATORY SYSTEM.

Asphyxia, therefore, if you will allow the term, may be classed as the chief danger referable to the respiratory system. The other anesthetic which may be compared in this respect is ethyl chlorid, which may cause death by spasm of the respiratory and laryngeal muscles, although there is here the coincident element of heart paralysis which does not pertain to nitrous oxid-oxygen. The effect in both is due to overdosage plus faulty ventilation. The one other prominent respiratory danger with all inhalation anesthetics is postoperative pneumonitis, inflammatory, tubercular, or pneumococcic. This sequella has for years been persistently blamed on the anesthetic, especially ether, and the term *ether pneumonia* is still frequently heard. Ether vapor is of course more irritating to mucous membranes than any other anesthetic, and when applied continuously for an hour or more tends to break down the defense of these tissues. Chloroform and ethyl chlorid do less harm in this respect, and nitrous oxid-oxygen least of all. Postoperative lung troubles occur after all anesthetics, even spinal. The anesthetic acts only as a contributory factor in the lowered resistance and disturbed metabolism resulting from the whole operative procedure. It is my firm belief that a very large majority of postoperative pneumonias are entirely due to careless nursing and exposure.

CIRCULATORY SYSTEM.

With reference to the circulatory system the effects of various anesthetics which may be immediately or remotely dangerous have to do chiefly with the heart and blood pressure. In regard to effects upon the heart muscle and its nervous mechanism, nitrous oxid-oxygen is indisputably the least injurious. Heart complications are conspicuous by their absence and at no time, even in four or five hours' continuous gas anesthesia, do we see the violent stimulation of early-stage ether, followed later by rapid, thready pulse; the alarming depression of chloroform or the heightened pulse pressure of ethyl chlorid.

Changes in blood pressure, or what is more significant, as pointed out by Drs. Moots and McKesson, in pressure ratio, are universal effects of all anesthetic agents when exhibited to the point of complete anesthesia. Under nitrous oxid-oxygen properly administered the variation in pressure ratio is so slight as to be scarcely perceptible and indeed is frequently such as to be beneficial rather than otherwise. A pre-existing hypertension, particularly when accompanied by arterio-sclerosis, is commonly stated as a contraindication to nitrous oxid-oxygen. This does not seem to be supported by clinical reports nor by my own experience. In a large general surgical clinic I am called upon to anesthetize a considerable number of patients with hypertrophy of the prostate for the two-stage suprapubic prostatectomy. As a class they are poor anesthetic risks, especially for ether, a large percentage of them being past middle life, having increased blood pressure, various degrees of arterio-sclerosis and bad kidney conditions. Nitrous oxid-oxygen is undoubtedly the anesthetic of choice for them, and I have yet to see any change in blood pressure sufficient to cause the least apprehension, the variation, if any, being transient. Compare this absence of one very important element of danger with the persistent, progressive and protracted hypotension under third-stage ether; the even greater depression of spinal anesthesia and the sudden alarming fall under chloroform. An asphyxial hypertension may often be seen in a poorly-managed gas anesthesia, due to insufficient admixture of oxygen or obstructed air passages. But this is the fault of the anesthetist, not the anesthetic.

Concerning the changes in character and constituents of the blood under different anesthetics the researches of Dr. Theodore Castro, of Dr. Crile and others seem to indicate that whatever changes occur in coagulability, hemoglobin content, cell relations and morphology, hemolysis and acidity are more or less transient and do not constitute elements of especial danger. But they prove that all such blood effects are far less marked and less enduring under nitrous oxid-oxygen than other anesthetics. This is particularly marked in comparison with ether, which produces a leucopenia and reduction of hemoglobin that often persists for days.

GLANDULAR SYSTEM.

Time will not permit us to discuss in detail the comparative effects of the different agents on liver, kidneys and the endocrin glands. But published researches satisfactorily prove that deleterious effects of nitrous oxid-oxygen, are either nil or transient and constitute neither immediate nor remote dangers to the patient, the normal or preanesthetic functioning of all organs becoming re-established within a few minutes or an hour after the anesthetic is removed. Is not this a most vital element in the problem of recovery from operative shock? Again, in the much-discussed field of acidosis, while it is not claimed that nitrous oxid-oxygen anesthesia is never contributory to this postoperative complication, it is certainly associated with far less acidosis, if any, than other general anesthetic agents. Metabolism is only transiently, if at all disturbed, as also the phagocytic power of the blood. The effect of ether, on the contrary, is such that the patient's opsonic index is not restored to its preoperative level for from two to five days or longer. This feature of nitrous oxid-oxygen anesthesia renders it particularly available in septic cases, anemias, chronic debilitated patients and tuberculosis. These latter considerations, together with its prompt and complete elimination, the absence of appreciable injury to any cells of the body, and vastly better psychical condition and the ability of the patient to resume nourishment early, certainly reduce postoperative dangers to the minimum.

INDICATIONS AND LIMITATIONS.

One of the chief arguments for the safety of nitrous oxid-oxygen and its value to the surgical profession lies in the fact that, in the presence of what may be classed as *grave surgical risks*, severe infections, pathologic and symptomatic anemias, traumatic shock, acute pulmonary affections, and moribund conditions, the *surgeon* chooses this anesthetic *because it will do his patient less harm,* immediately and remotely, than any other general anesthetic. He may elect to operate under local anesthesia if possible, or under intraspinous injection in a few cases; but when all other general anesthetics are contraindicated he will call for *gas.* All authorities agree that nitrous oxid-oxygen is the choice for minor operations and cases of short duration, the only objection offered being its high cost. This latter consideration should be unworthy of the careful surgeon, for the welfare of his patient should certainly not rest on the question of an added expense of two or three dollars per hour of operating time. Moreover, if the patient or friends are consulted and the advantages of quick, comfortable induction, absence of choking and smothering sensations, prompt recovery without nausea and vomiting, and greater safety explained to them they will scarcely ever hesitate to assume the slight additional expense.

In enumerating its pathological contraindications authors are accustomed to mention chiefly the following: (1) Respiratory obstructions, such as very large tonsils, tumor or cellulitis of neck, emphysema, empyema. (2) Pronounced arterio-sclerosis or atheroma. (3) High blood pressure. (4) Aneurism. (5) Dilated or *fatty* heart or uncompensated valvular lesions. I have mentioned these in the order of their importance. But as I already have asserted, the dangers during administration of nitrous oxid-ogygen are almost all predicated on the occurrence of asphyxia, which by skillful administration always can be avoided. Excluding this possible element of danger the above contraindications are no more potent with nitrous oxid-oxygen than any other general anesthetic.

The field of abdominal surgery embraces a comparative and reasonable objection to this form of anesthesia in the feature of insufficient muscular relaxation. Beyond question nitrous oxid *per se* does not completely relax the musculature and herein lies one of its chief elements of safety, for the preservation of muscle tone is a very important desideratum throughout the entire surgical procedure. Several anesthetists have asserted that they are able to secure any necessary abdominal relaxation with nitrous oxid-oxygen. But their technic usually embraces the employment of adjuvant agents plus the intelligent co-operation of the surgeon. By conscientious and studious team work of surgeon and anesthetist, beautiful results are possible.

Abdominal surgery can be and is being done with entire satisfaction under nitrous-oxid-oxygen anesthesia; but if the surgeon demands absolute relaxation or *dish-rag* anesthesia, if I may term it such, without supplementary anesthetics and conscientious team-work, both surgeon and anesthetists are alike frequently doomed to disappointment. Outside the abdominal field there are limitations to the availability of nitrous oxid-oxygen from the operative standpoint, not as to safety in general. Nose and throat operations as well as brain surgery may be better accomplished under ether-vapor insufflation, the former because of the difficulty in maintaining an even plane of anesthesia and the latter because of greater congestion of the peripheral circulation under nitrous oxid-oxygen.

As to age limitations there need be practically none in the hands of a skilled anesthetist. Very young children are said to be bad risks for *gas* anesthesia because of their greater liability to asphyxia. This disadvantage is offset, however, by the fact that complete anesthesia can be maintained in children with a very small volume of nitrous oxid and a corresponding higher percentage of oxygen. My own experience has embraced patients from six months to eighty-four years of age.

The large field of anesthesia for dentistry and oral surgery I leave to the specialist in that branch of the profession, offering, in passing, my opinion that the management of successful and satisfactory nitrous oxid-oxygen anesthesia, for oral procedures is a more difficult matter than for major surgery, mainly because of the necessarily attendant irregular breathing, the limitations of the upright posture, the difficulty of regulating the mixture of gases on account of air dilution by mouth breathing, especially during the nasal technic of administration. Of its value as an analgesic and anesthetic in their specialty the most experienced dental surgeons and anesthetists preponderantly testify.

In closing, I shall mention one other field in which nitrous oxid-oxygen analgesia and anesthesia is eminently available and should, I believe, supplant all other anesthetics. This is the field of obstetrics. Its quick and pleasant induction, its rapid elimination, its comparative absence of immediate or remote danger to mother or child, and its really efficient relief of pain. even in the form of analgesia, render nitrous oxid-oxygen the anesthetic of choice in normal labor and operative obstetrics. It has the very great advantage over morphin-scopolamin amnesia of being under the prompt and absolute control of the anesthetist and obstetrician.

2747 Espy Avenue.

THE BENEFITS DERIVED BY EARLY TREATMENT OF MALOCCLUSION*

BY JOS. D. EBY, D.D.S., ATLANTA, GA.

ORTHODONTIA is that branch of dental science which treats of the *prevention* and correction of malocclusion of the teeth and the surrounding parts. To digest this definition leading up to our main subject, we may start by stating that the treatment of all cases of malocclusion is expected to produce improvements in various forms.

In restoring the normal contact point from tooth to tooth in the individual arch the greater liabilities of inter-proximal decay are lessened; in this we have one benefit derived from regulation, i.e., the preservation of the teeth.

This great phase of orthodontia is viewed too lightly by the profession and practically is overlooked by the laity, who generally seek for improvement of appearances only.

By restoring alignment, the interproximal papillæ are restored to the self-cleansable normal, and the great liability of diseases of the soft tissues forming, as the results of the housing and impaction of bacteria-growing debris, is prevented. The small initial lesions in both the teeth and gums which we prevent by orthodontic treatment may each be elaborated upon at length.

The small cavity ultimately may destroy the pulps, causing abscesses, sinus involvements, or fatal secondary infections by transmission through the blood stream. Vincent's angina and pyorrhea usually develop in mouths where the field is favored by malformations. All of the conditions, if resulting in nothing more serious than impaired mastication, necessity of restorations, etc., are life-long besetments and burdens at best.

In cases of Class I, or neutro-occlusion, wherein the teeth have migrated mesially or distally as the result of premature losses of deciduous teeth, or the extraction of permanent teeth without further care, the changes usually produce vertical biting relations in occlusion; thus the occlusal surfaces and incisal edges are worn flat by attrition, so that the teeth become merely mashers instead of grinders. The early correction of these tendencies, of course, possesses a great preventive value, for the advanced stages of such destructive results are practically impossible to correct.

In neglected cases of Class II, otherwise known as disto-occlusion, can be appreciated fully the value of early interference. After this class becomes "fixed" in advanced age, the arches become so intimately blended in their warped and distorted outlines as to be almost beyond the reach of correction, at least on the basis of normal occlusion.

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*Read before the Georgia State Dental Society, 1917.

The protrusion of upper incisors in the first division of this class deflects the upper segment of the orbicularis-oris muscle upward, rendering permanent a shortened upper lip. The cutting edges of these incisors striking the lower lip exercise it so continually that it becomes enlarged or bulbous; also deepening the groove between the lower lip and the point of the chin, by which, with the narrowed buccal features, the facial expressions are entirely changed.

In the inner frame-work of this class, the floor of the nose is elevated and narrowed permanently, preventing normal breathing. The dome of the palate is heightened, affecting the resonance of the voice; the mandible is under-developed, the muscles of mastication shortened, and the necks of the condyles are formed vertically. The lower incisors become elongated and with the alveoli seasoned in these malformed outlines, the condition never can be transformed back to normal, all the result of failure at early interference.

In the second division of Class II, normal breathing changes the pressure of the overlying muscles of expression which control the directions of development of the underlying osseous structures. This division usually presents the retrusion of the upper incisors caused by the backward pull of the muscles, originating in the distal mandible and inserted in the upper lip. By moving lingually such incisors must become slightly elongated, producing a closed-bite malocclusion, completely hiding the lower incisors. If neglected, this type invariably results in the wearing away of the occlusal surfaces of the posterior teeth, the lingual surfaces of the superior incisors and labial surfaces of the inferior incisors, which, when once destroyed, are lost forever.

In Class III, which sometimes is recognized as mesio-occlusion, the most striking examples of the horrible distortions of the dento-facial area as the result of neglect can be found. It is with the rarest exceptions that this class appears in the deciduous teeth. This class usually results from enlarging tonsils or the mesial interception of the lower teeth at about the age of the eruption of the permanent teeth.

When the cutting edges of the superior incisors strike the inferior incisors in a state of linguo-version, and when the buccally inclined planes of the superior posterior teeth occlude with the lingual planes of the inferior posterior teeth, nature's plan of locking the arches in stationary relations under the stresses of mastication so as to counterbalance and harmonize all of these muscular forces, is completely broken up. The result is that the forces against the upper arch are all deflective, from without inward, which restricts the development of the arch and causes its further collapse.

The forces against the lower occlusal surfaces borne by the lingual inclined planes are applied at an angle of approximately forty-five degrees off the long axes of the roots of the teeth, which, by this indirect line, centers a fulcral point in the cervical region of the teeth, which allows the crown to move lingually, with exactly the same amount of opposite effect produced in a buccal direction in the region of the ends of the roots.

These badly misapplied forces produce a stimulation for an ever-increasing mandibular development, irreparably increasing the volume of the mandible, producing a deformity which, if neglected, will not reach a state of rest before 25 or 30 years of age.

There are many other phases of malocclusion which would serve to illustrate the results of neglect as a plea for the preventive value of early correction. The majority of such cases result from ignorance, poor circumstances or environment; but it is a deplorable fact that the general tendency on the part of dentists consulted on this subject is to suggest waiting a few months or years until the patient is cast into a poor frame of mind concerning the importance of the work, and the proper time for interference is either overlooked or not recognized.

In the examination of great numbers of deciduous arches it never has been the writer's experience to encounter very extensive malocclusions. In the mouth-breathing classes the characteristic formations develop in the deciduous arches, for which immediate expansion to stimulate nasal development is of greater importance than the effects of expansion made in the mouth. In deciduous arches where torsion has reduced the normal dimensions, development is most readily indicated in order to aid nature by preparing the way for the oncoming permanent teeth.

The above facts are recognized more in theory than in practice, however, and under the present status it is very rarely that the orthodontist is consulted until the alarmed parent of a child between six and ten years of age discovers some badly displaced permanent tooth, or a diffused malalignment in the incisal segments of the arches at that time. It is my belief, and has been my experience, that parents of children between these ages can be led to appreciate and understand nature's plan for the development of the arches for the succession of the deciduous by the permanent teeth, after careful description, more fully than at any other time, thereby always affording the best degree of interest and co-operation to insure success. This is natural, for the parent's minds are adapted to the conditions of the growing child.

In starting the description of causes and treatment to the parents it first is explained that the superior and inferior maxillary bones are compact structure or original formation. Before the deciduous teeth erupt there is no alveoli.

It is explained next that the alveolar process is strictly a transitory tissue, first budding off of the maxillary process and growing downward with the developing deciduous teeth. The destruction of the process socketing the deciduous roots and the regeneration of new tissue for the permanent teeth is carefully explained, and it further is explained that when permanent teeth are removed and the individual has no further need for the open socket, the alveolus is absorbed, leaving the rounded maxillary ridges as originally.

After this it generally is simple enough to explain the plan of development of the arches in all directions by the eruptive forces of the teeth, both deciduous and permanent, particularly describing the function of the deciduous teeth in guiding the permanent teeth to position. After this it can be shown in the mouth how nature has erred in this plan of normal development. It then can be explained how, by artificial stimulation with the aid of mechanical apparatus, these first complications may be overcome, and by placing nature back in the normal schedule of development the malocclusion will be overcome. Certainly there can be no service greater than the wonderful preventive value of such interference.

These cases must be watched until all the permanent teeth anterior to the first molars are erupted. In the majority of cases treated at this age, development across the posterior sides is the first necessary step, and must be made in the presence of the deciduous cuspids and molars. This work, from the standpoint of deep stimulation, must be made before the roots of these teeth are too far absorbed, or the results will be only to force the teeth off the ridges and not influence the underlying structures.

From this age until the full eruption of the bicuspids it is impossible to stimulate alveolar development, making it necessary, therefore, to wait until the age of twelve to fourteen years. In the meantime the malocclusion increases, an insufficient volume of alveolar process forms and the same case which, with so little actual effort plus studious care could have been prevented, has been converted into one full of added difficulties.

Corrective measures instituted between the ages of six and ten years reach far beyond the teeth by producing first the growth of the bone, preparing the paths of normal eruption.

This is the greatest work of orthodontia and it is the duty of every dentist so clearly to recognize the value of development of collapsed arches before the roots of the deciduous teeth are too short that he may be able to advise and direct this proper treatment, thereby performing the greatest service which possibly can be rendered to the majority of children at this age.

WHAT NOT TO DO FOR PATIENTS.

BY FRANK W. SAGE, D.D.S., CINCINNATI, O.

THE YOUNG DENTIST, looking back over the first few years of practice, finds numbers of instances in which he has experimented at loss to himself, for his patient's benefit. The appliance specially devised, the unusual operation performed, did well for a time only, to fail, finally. Now, perhaps, he finds himself confronting the alternative of doing the work over for a nominal fee or none at all, or offending his patient.

Dentists learn sooner or later to limit their experimenting with appliances or methods not fully tested. The dentist-inventor who glows with enthusiasm as he describes in the dental convention his new appliance or method, may be pardoned for his partiality; nevertheless, the young dentist owes it to himself to examine for himself with closest scrutiny, with a shrewd eye of forecast, before adopting the new suggestion. Many devices or suggestions will do only for exceptional cases. The dentist needs to use his eyes, his judgment, to foresee the probable outcome.

It is no difficult matter to decide whether this or that operation or appliance will do the work. Yet every dentist sees daily, operations by fellow practitioners which a little deliberation, a little forecasting of results, should have forbidden. Often, no doubt, the patient's fear, or his persistent adherence to some preconceived notion, swerves the dentist from a better course he might have taken. It is the height of folly in the dentist to be influenced by the wilful insistence of a patient who knows nothing whatever of the requirements of his own case, and the dentist who is aware of weakness in listening, needs to take himself firmly in hand, first of all. I might dwell here at length on this point, but as Kipling says, that is another story.

Still, we must experiment if we would progress. Note here the supreme importance of judiciously selecting the patient for the experiment. The temptation is strong to try the new method or appliance in some desperate case where nothing else promises success, where even the new method is attempted with serious misgivings. The dentist in his heart of hearts feels that not even the new suggestion will do, yet in sheer desperation tries it. When failure results he perhaps rejects for all time the really valuable novelty.

Tact in handling patients means taking no risks with certain classes of people. Here comes a lady who takes your hand mirror and fussily indicates imperfections in the work you have done for her, imperfections which exist only in her imagination; telephones that fillings have dropped out, which you find *in situ,*—in short, is never quite satisfied with anything you do for her. She is the least desirable subject for an experiment, yet is the very one to set you to work on impossible undertakings, to gratify her whims.

A better subject is the portly, genial gentleman who pooh-poohs at anesthetics, who will let you stuff a napkin half way down his throat, without protest. The patient who prefers to pay you more rather than less, when he leaves the chair. We all have a few such.

Do not be tempted to depart very far from that to which your patient has been long accustomed, especially as to the new plate or bridge. You find a plate with upper incisors shutting within the lower circle, after a natural prognathism, no doubt, and you resolve to give the patient a pleasant surprise by making the new plate she requires, with incisors outside. Ah, ah, look out! If you only knew, the other dentist tried that, and had to change the occlusion to that you find in the old plate. This is a common error. Be not too sure, in making another plate, that a new shape, size, color of the teeth, will be regarded as an improvement. Be sure you consult the patient as you go along, if you make such changes. Here comes a patient wearing a plate with teeth arranged with faultless regularity. You perceive a thinness of visage, an angularity of features arguing that her own natural incisors overlapped. You change the arrangement scheme accordingly, and are mortified to find neither she nor her friends like it.

Another patient challenges your admiration of a set of teeth she wears, which to your conception are glaringly wrong as to color, size, arrangement. Do not, as you value your reputation, go ahead with a new set radically different from the old one. You might almost as well tell some mothers their babies are not pretty, as to criticise their artificial teeth. Be careful!

This, of course, does not mean you are to repeat the error. Yet some patients are so constituted that they shut their ears to suggested improvement.

If the young dentist is aware of not ranking among the most skilled of the profession, he needs to consider very carefully whither he is likely to be led in attempting an unusual operation, especially one involving much labor and expense. As you value your time and labor, beware of insisting in a matter concerning which the patient manifests indifference, or perhaps even disapproval. Even though you are sure of being able to accomplish something which ought to surprise and gratify the patient, the question first of all arises, is this patient one of the appreciative sort? Some patients are so constituted after a perverse fashion, that they refuse to see good in even an invaluable service. With such do not insist.

Among the things not to do for a patient, is to attempt some operation by way of correcting an evil complained of, which operation, if unsuccessful, is liable to aggravate the evil condition. For instance: a lady presents with an amalgam filling in the lingual surface of an incisor, which has stained through to the labial surface. Before attempting to remove the filling with a view to substituting cement or other filling, consider that such stain denotes an approach to the pulp more or less imminent, so that removing the filling and all the stain must mean a still nearer approach to the pulp and increasing risk of causing its death.

If your patient is one of the captious kind, it is better plainly to indicate the danger, impressing upon him or her that removal of the pulp means loss of color in the tooth. I believe it is often best, dealing with a captious patient, to resort to the more radical way, as in this instance, of crowning, to avoid a possibility of criticism on account of a change of color. Yet through unwillingness to cause the patient expense, many dentists in this instance would risk irritating the pulp, in order to restore the color with a cement filling or lining. At all events, fail not to apprise the patient of complications liable to ensue on removing the old filling. Little observances of the kind make the difference, ofttimes, between a patient lost and one placated and retained.

Since I have drifted into narration of specific cases, let me add another: do not fill over pulps liable to ache. In principle it is all very well to attempt saving every pulp, as was done years ago far more than today. In practice, the good occasionally achieved is far more than offset by the resulting complications of pain and inconvenience attending many failures. Consider for a moment: if it comes to the necessity of removing a filling and the pulp later, you have a case difficult in the extreme to manage, to wit: a congested and inflamed pulp insusceptible to the action of devitalizing agents, or obtundents; in short, a pulp which can be extirpated, nine times out of ten, only at the expense of severe pain to the patient, and prolonged after-treatment. Whereas, if the pulp had been boldly attacked in the first place, while uninflamed and uncongested, it might easily and probably painlessly have been destroyed, and the patient saved from a most unfavorable impression of dental ministrations. [Note:—Healthy pulps are easily devitalized.]

I long since have adopted it as an axiom in my practice: a pulp which has once ached, or which has even caused serious uneasiness, must be extirpated. Such pulps never survive.* I write this deliberately, after long observation.

There is an element of humbuggery, if you chose so to call it, which ought to be employed more rather than less, in dental practice. Here comes a girl, white with fear, in custody, as it were, of her mother, to keep an appointment. She is slight of build, pale, anemic, utterly incapable of summoning resolution to endure any pain whatsoever. You see at a glance her teeth will prove exquisitely sensitive. She is forced into your chair by the mother.

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*Quietly die and—breed streptococci.

"Now, Alice, sit right down and let the doctor do what is necessary. For shame, Alice! There, don't be a great baby!"

How admirably the mother braves it out for her! But—are you going to operate for this frightened-to-death child without even a word of reassurance? On no account. Better not operate at all, today. Now for a little humbug preliminary treatment. Well—not so distinctively humbug, either. Treat those labial cavities with silver nitrate; tell her to come again in three days for a second treatment, meanwhile using an alkaline wash at night. You may even sacrifice mamma in the interests of the patient. Intimate pleasantly that mothers do not always appreciate how sensitive some teeth are. Ask her mother how she would enjoy the operation. Never mind how or what she answers; what you are after now is to establish yourself in Alice's good graces. Wait a few days, repeating the silver nitrate treatments, or sealing into other than labial cavities the required sedative. Meanwhile the young lady is becoming accustomed to your instruments, and fears them somewhat less. We need every advantage, in treating such patients.

What not to do for children is perhaps the most perplexing question of all. They must be served, yet how? It is laid down as a general principle that the dentist's treatment of children must at all events be kind and gentle. But there are other ways, not the antithesis of this. I believe it a good plan to express your displeasure with the actions of certain children. Discovering that they are simply seeking to delay and thwart your efforts, it is often an excellent way to desist, after a time, refuse to make further attempt, and dismiss the little patient. Let him see you are thoroughly displeased. Insist on his going away. Never mind the parent's insisting; dismiss the case. Later, if you please, you may indicate to the mother a willingness to try again, another day. A note discreetly worded, or a telephone message, will be likely to bring the little patient in again, wearing a chastened expression, an expression of a wish to conciliate you. This is as it should be; you have diverted the child's mind from his own fears for himself into another line of thought—a fear he may again incur your displeasure. You have thrust back on the parent responsibility for neglecting to train his or her child to "endure hardness," to submit to necessary pain. In many instances I have found this plan to work admirably.

In one instance I tried another ruse. A girl of nine, brought in by her mother, refused for an hour so much as to open her mouth for an examination. Sat dumb, flintily immovable. I learned in a little aside from her mother that she had had several teeth filled the week before, since which event it had been found impossible to persuade her to return to that dentist.

The ludicrous aspect of the situation so impressed me that I burst into laughter, greatly to Mary's amazement. However, she remained obdurate, and her mother took her away, venting her displeasure, declaring that Mary should stay at home with the cook all summer, while the family sojourned at the seashore. I secretly indicated to her that she might hear from me presently.

That afternoon I wrote a note, not to the mother, to Mary. I intimated that we had got a wrong start that morning, delicately leading up to a suggestion that mothers are apt to be a hoodoo in a dental office, and suggesting that she come alone, at ten the next day, and I thought we might do much better. At nine the next morning came a telephone message, Mary's voice, subdued, wary. She said she would come, and "Mind, don't you tell, for nobody knows but the governess."

Sure enough, at ten in she came, radiant, smiling, and sat down in my chair without a suggestion of hesitation. I filled three teeth, and while she protested somewhat, it was a protest indicating a determination to brave it out, at all events. Shook hands at parting, and said, "Wasn't it a good joke on mamma?"

We must often resist the mother who declares she cannot come again; too many engagements. If you deem it necessary, for prudential reasons, to temporize with a child, let not the mother's objections prevail. It is better to state reasons repeatedly, if required, in order suitably to impress the mother. She will think all the better of you for firmly insisting on your suggestions being carried out even at inconvenience to herself. That is a phase of human nature many dentists seem not to recognize. You must often insist, openly thrusting back upon the mother responsibility for ignoring your wishes. She will respect you all the more.

This is one of the suggestions which should not be necessary, yet are eminently necessary for the guidance of every weak-willed dentist, who needs to begin with himself in correcting errors in his practice.

In order to get a dental practice into smooth working order, numerous apparently trifling matters, concerning the relations with parents and guardians, must receive diligent attention. After a year or two, the dentist's reputation for business-like methods in appointments will have become established, and he will find he has the upper hand of his practice, instead of being at the mercy of any one who chooses to abuse his leniency.

DENTISTRY AT THE MICHIGAN HOME AND TRAINING SCHOOL

BY GLENN A. GRAHAM, D.D.S., LAPEER, MICH.

THIS IS a State Institution for the care and training of the feeble-minded of all ages and both sexes. At the present time the epileptic patients of school age also are admitted, due to the fact that the State Institution for Epileptics has as yet no school department.

Dentistry in this and other institutions of its kind to some degree marks the beginning of a new era. It contains the germ of an idea which in a limited time will extend over the entire country.

The question may arise, is dentistry justified in such an institution? What does it portend, and what can it accomplish? There should not be much question as to its value, and that it is an important asset to the institution.

If every one could realize the condition of the mouths of these patients, and see the work that has been accomplished, they would have been appalled at the prospect.

It should be understood that the patients at this institution are feeble minded; therefore on a low plane of development. To a large degree they are the children of poor people and had little or no dental attention before they arrived at the institution. Some dental work had been done at this institution by local dentists, but was limited almost entirely to emergency cases. There are something over 1,500 patients in this institution at the present time. This is somewhat in excess of the accommodations, and there is a long waiting list.

Much credit for having a dentist permanently at this institution is due to the splendid type of man and public servant, Dr. H. A. Haynes, Superintendent of the Michigan Home and Training School, who is giving over his entire career to the education and care of these unfortunate people. Dr. Biggs, the assistant superintendent, is untiring in his work in the interest of the patients and aids the dentist in every way possible. The following is a summary of the operations I have done in the eight months which I have been here:

Fillings—389.
Kinds—Silver, synthetic, copper cement.
Extractions—1082.
Treatments—344.
Prophylaxis—920.

We have an up-to-date dental office, located in the operating room of the old hospital, which has been fixed over for a cottage for high-grade girls who are trusties.

A dental history is made of every patient, including the operations done for them.

The amount of suffering saved these unfortunates is untold, and their manner and willingness to be operated upon shows their appreciation of what is done for them. A careful record has been made of doubtful cases for X-ray work, which we hope to do in the immediate future. To some extent the prosthetic work has been done for the brighter patients.

Special attention is given to prophylaxis, for therein lies the key to progress of dentistry in an institution of this kind. Besides putting the mouth of the child in a hygienic condition at the office, we have done considerable to keep it in that condition by seeing to it that each child has a tooth brush, which is marked with the patient's number, and is kept in a dental case as is pictured below.

The teeth are brushed twice a day, morning and night, one or two attendants for each case to see that the cleaning is done properly as the necessity may require.

Much malocclusion is due to too long retention of the deciduous teeth, which to a certain degree accounts for considerable extraction. There is also a large number of acute abscesses due to the low rsistance of the patient. Also cases are presented which show the need of dental attention to retain the first molar teeth.

Perhaps some of the characteristics of the patients should be mentioned. The amenability of these children to treatment is important. They cause very little disturbance. A certain percentage of the children are insensible to pain, and the extraction of a tooth wouldn't cause them to flinch. A certain percentage are extremely nervous and somewhat hypersensitive to pain. Both infiltration and conductive anesthesia have the desired effect, no cases showed any untoward symptoms from the injections. Some children ask if it would be possible to have their teeth straightened.

A large number of cases of mouth infection have been cured and a greater number prevented by the hygienic methods now in daily practice. Some cases of specific lesions of the mouth have been healed by the use of a 20% solution iodin in glycerin and Park-Davis mixed treatment. Also euthymol mouth wash is used every two hours in these cases.

We have begun tooth-brush drill in the school. The work will be in charge of Mrs. Lyons, the principal, assisted by the other teachers. They will teach the children the theory of decay in simple language. Also the rotary motion of the tooth-brush, starting the brush on the gums and rotating toward the occlusal surface, on all surfaces of the teeth; buccal, labial, lingual and occlusal. They also will teach the child the individual care of the brush to keep it in an aseptic condition.

Perhaps a little about the classification of children and the school will be interesting.

The patients are classified according to age and mentality; by this is meant that children of 20 years chronologically, and mentality by the Termin-Stanford-Binet testing only six, are housed by themselves. Following this classification the children are associated with their kind and hence enjoy the same forms of amusement. All of the children are tested by the Termin-Stanford-Binet tests, and are placed in school according to the test, and so far as possible the industrial classification is based upon this test.

The feeble minded are classified in three groups, as follows: Idiot, imbecile, moron. These are subdivided into high, middle and low. The idiot has a mentality up to two years; imbecile from three to seven, and moron from seven to twelve.

There is a corps of fifteen teachers to instruct all children who are trainable. While academic work is not the strong point, yet every child is taught all he possibly can learn, and then he is transferred to the industrial departments, where he becomes interested in some particular line, and with the various amusements and entertainments his life may be made happy, and that he may enjoy life to the fullest extent of his mentality.

The school has the following departments:

Sense training.
Kindergarten.
Grade work (first to fourth).
Industrial department—

(a) Rug and towel weaving.
(b) Chair caning.
(c) Basketry.
(d) Plain sewing.
(e) Lace making.
(f) Vocal and instrumental music.
(g) Calesthenics.

Manual department, where the boys manufacture all the chairs and tables used in the cottages.

There is a band of about eighteen pieces, and an orchestra of girls is being built up. Children with a mentality of less than 10 do not make very good progress in music as a rule.

The other day several boys were in the dental office for prophylaxis and one asked if the water in the glass was good to drink. I told him it was and another boy said, "Sure, it is better than nothing; it is even more than the soldiers have to drink." Another spoke up quickly, "Oh, no! They have the whole ocean to drink from."

A negro patient, who is somewhat of a trusty, some days ago remarked to one of the teachers: "I haven't anything to say around here any more. I want you to know that I am free; Abraham Lincoln made me free."

THE NEW GOLD FILLING

HOW A BOSTON DENTIST FILLED THE BLANK LINES OF "APPOINTMENT" AND "BANK" BOOKS

BY FESCO T. FORD

OF COURSE I cannot name the dentist, but his office faces the "Common," and upon this sultry summer morning, the breezes from the bay cooled the humid atmosphere, in about as pleasant work and reception rooms as may be found in the broad reaches of the city of colonial romance, and modern "high-finance."

H. H. Hammertooth was not the dentist's real cognomen—facetious D.C. friends, during his pre-D.D.S. days, had made sophomoric play with Haig Harvey Hammertooth, to achieve *that* bit of drill-pointed pleasantry, but, as he sat in his office that morning—and listened, down-heartedly, to the resonance of ever-passing, never-pausing footsteps in the hallway, his mood became sufficiently indigo in color-tone to have changed the hue of the azure dome above, to one over which his mariner friend from the water-front would have shaken his salt-bleached "pall" and, at sea, have ordered every loose line-end belayed in storm preparation.

Across the common, he could see a member of the brotherhood of "mouth blacksmiths," one of the flamboyantly advertising in sporty press variety, and, as this artisan moved nimbly about his filled chair, in his hammer-and-tongs work, after "the gas" had achieved its quieting purpose, Hammertooth could see three fascinated waiting patients, as they gazed frowningly at the work.

"Huh! This gets the money! Nothing like dignified starvation, and a dog-house in the tenement district for Uncle Willie and his wife and kidlets!" had been this dentist's defense, when reproached for his apostasy from higher dental creeds.

"When I see that 'dub' across the square doin' somethin' more profitable than watchin' th' bench-warmers on the common about seven hours per diem, I'll follow his lead and become ethical, but——"

He paused, shrugged his shoulders, and soliloquized:

"*But*—I prefer my Hudson super-six, and my 'Buffaloed' motor-boat, to the tiny cottage with its 'rows-of-cabbages' stuff—my 'Queen' don't have to shoo potato-bugs, and—well—who cares a continental copper for anything but 'success,' here or elsewhere?"

Meanwhile, the aforesaid "dub" was doing some deep thinking outside the "grooves" of his professional training—thinking made essential by financial crises of more frequent recurrence with the passing months, and, after deep cogitation he nodded, grinned, and chuckling, said:

"I'll try it 'on,' by jimminy!— That is, if the dear girl hasn't forgotten how to manipulate her Remington— and she held the state Remington speed record for two years before our wedding,—provided, of course, she will undertake the task. I'll ask her this evening."

Accordingly, after dinner, that night, as his wife was sewing upon a fascinating feminine bit of lingerie, he turned from his game of solitaire and, grinning deprecatingly, said:

"By the way, Nadine, have you forgotten the 'trick' of 'teasing' the Remington's keys into highland flings of ecstacy, by drumming out letters, as you used to do before our wedding?"

"Certainly not. Why?"

"Well!" temporized he, "in times like these, about the last individual, save only the undertaker, of whom people think willingly, is the dentist. I have wondered if your nimble wits might not, perchance, conceive some untried variety of perfectly ethical publicity, which may bring the suffering public to realization of their need, and my profession."

His wife laughed, for the first time during days, and with a fascinatingly-tempting flush in her cheeks, replied:

"I *have* been thinking of that identical problem. Tell me, again, the incident of the old gentleman who brought his grand-daughter to you, and remained to have his own hollow cheeks re-rounded."

He related the incident, briefly, before starting for "the city," and had entirely forgotten the matter upon his return at night.

When he reached "the office" upon the following morning, he found an old gentleman awaiting his arrival, and, bowing, asked:

"How may I serve you, sir?"

"Don't exactly know if you can serve me a-tall," replied the old Yankee, grinning dourly; "but Mary Ann, after she had the 'letter,' give me no peace, exceptin' a piece of her mind, until I got into my gre't-coat, an' come down-town t'see what you-all can do for me."

The dentist grimaced at the word "letter," and thought, fearfully, of his thoughtlessness in permitting his wife to undertake ethical publicity, but before his visitor had left "casts" of his jaws and departed, two other citizens who had never before honored his office with their presence, came in and were "dated" ahead.

Before he closed his office that day he had done and "booked" more business than during any previous day of his professional career, but was wrinkle-browed in perplexity at the repeated references to his "letter."

When he reached the corner 'above' his home that evening, he met his wife returning from the post-box, and, as he walked up the graveled walk to the cottage, queried, good-humoredly, as to her desire to drive him into the ranks of professional outlaws.

"Why? What do you mean?" was her startled query.

"Well," he replied, "you know, do you not, that a reputable dentist may not advertise, yet you, seemingly, have been soliciting 'business' tor me by post. It has been good solicitation, too,—for I have had the best day of my dental career, as a result, but—"

She interrupted him:

"What in the world are you talking of? I have written no letters,— made no solicitation,—unless—unless—perchance—a dentist may not be mentioned in the news press without accusation of solicitation."

"The news press?" queried he. "What do you mean?"

"My little newspaper," explained she. "I told you, months ago, that, to stimulate school interest, the Mothers' Club was to issue a 'news-letter' concerning home and school matters, did I not? I have been made editor, reporter, pressman, and 'devil' for the first twelve numbers,—a month apart.—for the '*Berriman News-Letter,*' with, at present, a bona fide subscription list of eleven, and a total first-class circulation in one hundred and seventy-six homes."

"'*The Berriman News-Letter*'?" repeated her husband, in puzzled amazement. "May I see a copy?"

"Surely," was her reply, and, excusing herself and going to her sewing-room, she quickly returned with a type-stenciled mimeograph printed sheet, which she handed him without comment.

"Local News Item."

The column and page heading caught his eyes and he read:

"Nine pupils from the ninth grade were absent from Miss Matignon's room, upon the ninth of the month, because of digestive disorders, afterward traced to bad teeth.

"Miss Matignon insists that hereafter, the Berriman School admit no pupils whose teeth are in disorder."

"'Billy' Sanderson heads the class in Ancient History this month. Her keen appreciation of the Celt as a world benefactor—or world threat—said to be responsible."

"Danny Burke, when asked by Miss Matignon 'Who is the greatest living American?' replied: 'Doctor Hammertooth. He snagged five bad teeth from me jaw without makin' a feller let out a 'yip,' an' without talkin' me arrum off, or usin' 'soop-he-ate,'—whatever *that* may be."

"Muriel Black has a very golden smile since her visit to *the* dentist last week. When she parts her lips just enough to smile she reminds her friends of what they style 'heavenly gates ajar'—but when she really laughs, the whole class thinks of Alaska, because of the treasure there. There'll be another gold-rush if she laughs much. She has borrower her sister's Remington typewriter and is writing her version of the 'Cruise of Jason,' in blankety-blank verse, for the *News-Press*.

"It is said that the last gold-lode discovered in the Western hemisphere was in DeWolf Flopper's mouth after Dr. Hammertooth had taken about a week's gold-earnings from DeWolf's pocket."

THE CRUISE OF JASON

MURIEL BLACK

"When Jason went a-courting
Far off, on golden sands,
He told folks he was sporting
Afar in frozen lands.

"Far North, to Maine, he hied his way,
And shoveled in the sands rare;
What mattered, if his hair was gray,
If she preferred his hand, there?

"He found the gold—the story told,
And found a Helen also;
Eloped away, this couple gay,
But Helen's teeth were false, Oh!"

The dentist laughed, albeit ruefully, and remarked:

"Seems to me, dear, you have missed your true calling. You should have been a theatrical press agent. I suggest, hereafter, that you divert some of your attention to other 'parents'."

"Why! What do you mean? Did you imagine that *I* wrote all those items?"

"Why not? You are the whole staff of the *News-Letter,* are you not?"

"Certainly! But, as it happened, the principal of the school is responsible for *this* outburst."

"How so?"

"Well, he has a class in elementary journalism and advertising, and, before last issue, he instructed his class to furnish, for the school-paper, items relative to the economic uses of gold—and illustrated his request by referring to gold as used in dentistry.

"Next issue is to be devoted to the economic uses of clay—and your profession can hardly enter into that issue at all."

The doctor laughed, good humoredly, shook his head—started to reply,—stopped, bade his wife farewell, and departed.

"I shall be curious to discover if any of the children properly associate clay and dentistry," thought he.

"In this day and age, the young folks seem to attain unusual mental levels at earlier age than was formerly the case. I shall watch the matter with keen interest."

When the *News-Letter* was received, a few days later, the "Doctor" was first to scan its contents, and, after reading, with rising interest, during a few moments, handed the sheet to his wife, and remarked:

"Modern school effort is so much broader in its scope than was that of my day and place, that I begin to appreciate one of the prime causes of the earlier adaptability for business of this generation.

"Listen to these items concerning clay:

" 'Porcelain and china, such as dishes are made from, is fine clay, bleached, baked and glazed, only.

" 'The Egyptians were the first to make vitrified (heat-molded) dishes, and some of their old pottery, made when the pyramids were builded, is still in every-day use.

" 'Egyptian mummies were frequently cased in baked, unglazed clay, for preservation.' "

"Here's another one:

"Modern explorers among the Aztec ruins of Cazadero, Wapimi, in Northwestern Mexico, have unearthed a skeleton, in the skull of which are four teeth as neatly 'filled' with porcelain fillings as can be done by the most modern dentist. Porcelain is clay, and the nature of these fillings makes it seem possible that, in pre-Columbian centuries, the Aztecs carried on barter and exchange with the Indians of Eastern Ohio and Western West Virginia, from which such clay as they then used is now brought."

There were a number of others equally interesting from the standpoint of the ethnologist, but a final item centered the Doctor's attention, and, whistling, he read:

"Dr. Nansen has recorded a fact concerning the world distribution of vitreous earths, which is of interest in creation's beneficences.

"The first specimen of vitreous clay working which fell into my hands, in North Greenland, was so identical in character and shape with another gotten in trade by Dr. Grenfell in Labrador, that it seems to establish a blood-tie between the farthest north and farthest south Eskimos.

"A singular fact is disclosed by the return, with the Nansen expedition, of a 'skimmie,' never before south of mid-Greenland, whose teeth are crudely but effectively 'filled' with baked clay.

"The Dental Association, in seeking information as to processes used in the far North, disclosed the fact that the art is controlled by a priestly cult, who guard their secrets zealously."

The Doctor gazed at the *News-Letter* intimately a moment, nodded, then asked:

"And who types these *News-Letter* stencils?"

"The scholars," was the reply. "Every student whose week average is above ninety becomes a member of the *News-Letter* staff, and each types, upon the school's official Remington typewriters, a stencil or a portion of a stencil for a page.

"But how does Dr. Hammertooth gain so much news mention?"

"Oh! That's simple," was the reply. "He cares for the teeth for so many of the scholars that they curry his favor and careful handling by press mention."

The medico laughed, and closed the incident by remarking:

"That's a valuable pointer. Hereafter, every patient from that school who comes under my care, shall be properly 'coddled' and cultivated."

Hammertooth has pointed one medium in which a doctor may, ethically, advertise.

MODELING COMPOUND AS AN IMPRESSION MATERIAL FOR FULL DENTURES.*

BY B. B. TODD, D.D.S., ATLANTA, GA.

MODELING COMPOUND, as an impression material, is very much abused and unless studied and worked along the proper lines, should be let alone. I make these remarks in order to save trouble and embarrassment. Modeling compound is the best impression material for full dentures, according to our authorities on prosthesis. As an impression material for orthodontic purposes, crown and bridge work, except saddle bridges, it does not rank or even come in the same class as plaster. Please get me correct on this. Full dentures require modeling compound for obtaining the best results.

The purpose of an impression is to reproduce a model or die the exact counterpart of the tissue or part we wish to work upon. In addition to reproducing the exact die, we wish it in the exact position it will occupy normally during stress of mastication. If we get it in some other position we do not have an accurate model from which to work.

The soft or muscular tissue is, of course, movable and in taking an impression it is possible to take these muscles in any one of three positions, whereas there is one position which will give greater stability and satisfaction than any other.

Up to the present time, the average dentist has been led to believe that plaster is the best material to use in taking a full upper or lower impression; and when an apparently good impression has been taken, the blame should be laid to the fault of the vulcanizer or in some stage of the procedure following the impression.

A few moments of careful thought in the proper direction will convince you that both the plaster impression and the present method of taking it are decidedly wrong, as well as the idea that an air chamber in the center of a plate is essential to secure a plate that will hold against the strain of mastication.

Past experience in making plates for patients who have had several failures has taught me that I have no use for plaster in any case where I expect a plate to be retained by so-called suction, or where I have to deal with soft and movable tissue.

The greatest comfort in a plate can be obtained only when you have equalized bearing on the soft and hard tissues when they are in their working position. Hence this equalization must be done in the impression in the *mouth;* and in order that there may be no doubt about the finished product, the so-called impression must be the exact model of the proposed plate so far as height of rim, thickness of edges and length of plate in the rear are concerned.

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* Read before the Georgia State Dental Society, 1917.

These features cannot be secured by the use of plaster, owing to the fact that when the mouth is opened, the muscles of the cheek and soft palate are all out of the normal position, and it is impossible to scrape the model to properly allow for the position they will take when relaxed.

Practically all plates made from plaster impressions with the mouth open have spaces all around the rim which were made by the muscles in their distended position. The buccal and labial borders of the plate being thinner and smaller, do not rest on the muscles or tissues in their relaxed or mouth-closed positions.

For this reason you test plates to see if they fit when the mouth is open, and they seem to stick like grim death; yet the patient will tell you that he cannot use them to eat or even talk with. It is then you generally blame all the troubles to the fault of the patient, etc.

The difference is due to the fact that when the mouth is open, the muscles are drawn tight over the edge of the plate, and the soft tissues are dilated, thus sealing the edges when the mouth is open. Your patient uses the plate with the mouth closed when the tissues are in an entirely different position.

MUSCLES OF THE LOWER JAW WILL STEADY PLATE.

By making the edges of the plate conform accurately to the muscles when in their natural working position, you have secured one of the essentials necessary to comfort in lower plate, viz: Should the plate be dislodged from its correct position the action of the muscles of the tongue and cheek will automatically carry it back to place without any effort on the part of the wearer.

As many lower ridges are almost completely covered with loose tissue and free-moving muscles, it is also very important to get an impression of these muscles under normal biting stress so that they will all be under equal tension when in use.

EQUALIZATION UNDER BITING STRESS ESSENTIAL.

The most successful denture is the one that fits best when in actual use; and as every mouth contains hard and soft parts, many of which are materially changed by the movements of the cheeks and sublingual muscles, it is therefore necessary to equalize the pressure on these tissues to conform to the natural stress applied by the patient.

Pressure over hard and soft spots can be equalized by proper use of compound, whereas it is rough guess work by the old method of scraping your model or impression.

The outline of your finished denture is of the utmost importance and cannot be carved out of the mouth to suit the operator's individual ideas as to where it should extend but can be carved only by the muscles rather than the operator. In like manner the posterior border of the plate should be accurately ascertained.

NAUSEA ELIMINATED.

The fact that a patient gags when a plate is in the mouth, does not mean that you should shorten the plate as many think, but that it should be *lengthened* until the edge of the plate can be embedded into the soft tissue, or if necessary into the soft plate, so that the tissue will be drawn taut over the edge of the plate.

The tickling sensation caused by the soft tissues vibrating under the edge of the plate, is the cause of most all of the troubles of nausea or so-called gagging. If you will trace some compound across the back of any plate, and have patient close and force it up into the soft tissues, you will rid the patient of this tickling sensation.

This lack of fit across the vault in the rear is due to the fact that when the mouth is open the soft palate is dilated or drawn down, and naturally pulls or changes the position of all the soft tissues that precede the soft palate. Hence when an impression is taken with the mouth open, you secure a false impression which will fit the mouth only when it is open. As soon as the mouth is closed, these tissues are relaxed and your plate does not fit to the tissues when in actual use either in talking or mastication.

After all these things are done you can check them up one at a time and see if the lower plate stays down when the patient opens the mouth or whether it will rise. Let the patient try by every means to dislodge the upper, which they cannot do, barring outside help. If all of these things are not correct you can correct and adjust your impression until you have it perfect or are yourself satisfied.

If you had not been able to check up your work at this step in the final accounting it is highly probable you could not have accounted for you misfit. Granting that your impressions are correct, it is possible by correct technic to make your dentures fit even better than your impression, whereas if your impressions are correct, yet your finished product does not fit, it is an error in technic in some subsequent step, of which there are many.

In conclusion, I will say that by skillful manipulation, modeling compound has many advantages over plaster of Paris, where plaster has no advantage over modeling compound except ease of manipulation. However, if you are going to use the methods carelessly and indifferently you will get much better results with plaster.

NEW PUBLICATIONS

Modern Dentistry. By Joseph Head, M.D., D.D.S., Dentist to the Jefferson Hospital, Philadelphia. Octavo of 374 pages, with 309 illustrations. Philadelphia and London; W. B. Saunders Company, 1917. Cloth, $5.00 net.

In the preface to this book the author says: "Dentistry, owing to the teachings of Pasteur, has at last awakened to its great responsibility. Henceforth no appliance, however beautiful externally, will be tolerated unless it can be kept absolutely clean, and no repair of a tooth or root will be countenanced unless it conforms to the standards of scientific mouth hygiene. Fillings, crowns and bridges are no longer to be considered mere objects of art for personal adornment or mechanical trituration of food; they must primarily be hygienic."

It was with this view of dentistry in mind that the author has written this book, and he has given us a complete treatise on the new aspect of dentistry. He has incorporated his own valuable discoveries with the methods accepted today as the best.

The subjects treated are as follows: Causes and Effects of Mouth Infection; Prevention of Mouth Infection; A Study of Tooth Enamel and Saliva; Treatment of Mouth Infection; Vaccines in Treatment of Mouth Infection; Treatment of Root Canals (32 pages); Fillings; Children's Teeth (57 pages); Crowns; Replacing of Lost Teeth; Experiments Concerning Strength, Solubility and Adhesiveness of Various Cements; Study of Roots and Gums By Means of X-ray.

Those who know Dr. Head and the thoroughness with which he does everything will appreciate more fully the value of this work. It is a book every dentist can study with profit and it should be in great demand. The text is well written, illustrated with 309 fine engravings and covers 367 pages. It is printed on extra good paper and the author and publishers are to be congratulated for giving the dental profession a work so valuable.

Oral Roentgenology. A Roentgen Study of the Anatomy and Pathology of the Oral Cavity. By Kurt H. Thoma, D.M.D., Lecturer on Oral Histology and Pathology and Member of Research Department, Harvard Dental School; Instructor in Dental Anatomy, Harvard University Medical School, etc. Boston; Ritter & Company, Publishers; 1917.

Roentgenology has become a most important means of diagnosis and a great aid in the treatment of diseases of the oral cavity. No dentist who has the welfare of his patients at heart should practice today without the aid of this important method of examination.

The author says that in writing this book his aim has been to base the Roentgenographic study of the mouth upon a broad knowledge of anatomy, histology and pathology, and in the first part to give the student as well as the practitioner a chance to compare photographs showing the outside and inner make-up of the jaws with the Roentgen picture.

In the portions following the various diseases affecting the teeth and jaws are taken up according to their pathological classification. With most of the pictures has been given a history of the case, a conclusion from the Roentgen picture and a report of operative findings, the result of the operation having been added sometimes with the intention not only of showing pictures but of giving the reader a most intimate knowledge of the case.

In the last part of the book the use of Roentgen pictures as an aid in treatment is taken up and the illustrations have been chosen with the idea of making the text a practical help. The text is divided into four parts: Part I, the Roentgenographic Study of the Normal Oral Tissues, includes the Development of Teeth and the Normal Adult Jaws and Teeth. Part II, the Roentgenographic Study of Pathological Oral Conditions, includes Irregular Eruption of Teeth, Diseases of the Hard Tooth Substances, Diseases of the Dental Pulp and Their Sequel, Alveolar Abscesses, Diseases of the Peridental Membrane, Diseases of the Jaws, Diseases of the Air Sinuses. Part III, The Use of Roentgenograms as an Aid in Treatment; includes Treatment of Root Canals, Apicoectomy, Prosthetic Dentistry and Orthodontia, Treatment of Fractured Jaws, The Healing of Jaws After Operative Interference. Part IV, Roentgenographic Examination of the Oral Tissues in Somatic Diseases.

The book will be found a valuable guide for the practitioner.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

ANNOUNCEMENT

Beginning July 1, 1918, the subscription price of THE DENTAL SUMMARY was increased as follows:

United States and Possessions	$1.50
Canada	1.90
Foreign, U. P. U. Countries	2.25

This increase is made positively necessary by the rise in the price of paper and cost of production generally, and will remain in force only so long as war conditions prevail.

LACONIGRAMS

The grand march on Berlin has begun. It may be halted and held up at times, but keep your eye on the Stars and Stripes and the boys who are carrying it.

It appears strange to some that three-months-old Yanks are able to show French and British veterans How to Do It; but it really was quite to be expected. The supreme self-confidence and self-dependence of the American branch of the Anglo-Saxon race has no equal in the world; in action it means initiative and football tactics that European nations know nothing about. We may be a peace-loving people, but the fighting blood never is more than a milimeter or two below the skin.

What are YOU doing to bring the war to a successful close right in your own community? There are plenty of Huns to be punished, plenty of pacifists to be educated, plenty of slackers to be hunted down and sent over in your town to keep several good men busy. Here in Toledo we rounded up over two hundred in one evening's hunt. And it isn't at all bad sport. Try it, get the taste of it into your blood, and you will want more of it.

How about that war garden? Do you know that one good man easily can plant, cultivate and care for nearly four acres without the use of horse or help of man? I know, because that is just what I'm doing. Fifty to sixty actual hours of work will carry that much through the planting and cultivating season. And say: Don't new peas, beans, potatoes and sich "sass" taste good to the town-dweller who lives out of cans for nine or ten months every year? 'specially if he's raised them himself.

Don't forget the Thrift Stamp; keep up your close relations with it. You can help a lot at little or no inconvenience to you. A cigar or two less per day, a drink that you "forget" to take, a half-sole instead of new trousers—these little economies that sensible men should practice anyhow, will afford a stamp fund that may surprise you. And you're not giving anything to anybody. You are saving and investing against the best security in the world.

THE SUMMARY is now $1.50 per year, just about one-tenth of its value to any practicing dentist. Without one disparaging word concerning any contemporary, we ask comparison with all of them.

It is a sacred duty of every citizen, recently declared the Secretary of the Treasury, and it should be regarded as a glorious privilege by every patriot, to uphold the government's credit with the same kind of self-sacrifice and nobility of soul that our gallant sons exhibit when they die for us on the battlefields of Europe.

Martin's Pyorrhea Treatment is having a most unusual history of success. It rests upon the most modern conceptions of treatment—the stimulation and reinforcement of natural tissues rather than the destruction of invading bacteria. It is now pretty definitely known that disinfection by germicides does more harm than good. Any medicament powerful enough to destroy micro-organisms is pretty sure to attack normal tissues, to their detriment if not complete disintegration. If you have not tried Martin's Treatment, write to me, and I will tell you where you can obtain first-hand information concerning its use and results.

The latest news is to the effect that the entire medical profession is to be given the choice of volunteering or conscription in government service. This does not mean that all are to be sent abroad, but that those not so disposed are to be assigned to service in communities where they are needed, relieving the congestion in those in which there is a surplus. It is not at all unlikely that a similar course may be taken with regard to dentists, so may as well prepare for it. We are at war, and every move that may help to win it may be expected.

The Ransom & Randolph Co. has installed a chemical laboratory, in which will be produced all of the various medicaments and other items of a chemical nature marketed by that concern, the demand for which has made this departure necessary.

Dr. Theodore C. Schwartzbeck, for seven years located at Findlay, Ohio, has sold his practice to Dr. G. E. Harper, and has moved to Detroit. He is to be added to the faculty of the Michigan State University, in the department of oral surgery and X-ray work.

It is planned to place all dental graduates of 1918 in hospitals to serve as internes for one year before entering active military service, as announced from the surgeon-general's office at Washington. It is understood that they are to enter hospitals not later than November 1.

Dental fees have advanced 25 to 50 per cent. over in Indiana, where they have been far too low.

Dental Surgeon Weeden Osborne, of Chicago, killed in action June 8, has been posthumously cited for bravery by General Pershing, and a "distinguished service" war-cross awarded his family. Dr. Osborne was but 25 years old, and was instructor in dental surgery at the Colorado University at the time of enlistment.

Suspect bad teeth in all cases of heart-trouble.

It is stated that no more dentists are to be called to the colors for at least six months. There are now 5,810 officers in the dental corps, sufficient, it is supposed, to care for an army of 5,000,000 men.

Dr. C. J. Baker, Director of Child Hygiene in New York Department of Health, states that if all the dentists in the United States should move to New York City, they would be unable adequately to care for the teeth of those who need dental services badly in that city alone. This surely does not indicate an over-crowded profession.

It is proposed to give all dentists and physicians regular military training as soon as necessary arrangements can be made. No telling how soon they may need to fight for their lives and their freedom.

A new dental infirmary has been erected at Camp Upton at Bridgehampton, N. Y., at a cost of $12,000. The hay-sheds alone cost $50,000! Well, pigs and horses always have come first.

Dr. Oscar Conzelman, St. Louis, is recovering, minus his right arm, the result of infection from patient. Take care; you never can tell.

Many dental societies are resolving to buy no materials made in Germany during a period of fifty years following the close of the war. These will help some if lived up to.

The demand for first-class dental service will be multiplied many fold by the compulsory treatment accorded our soldiers. When these men return to their homes they will insist upon this great aid to health and efficiency, and influence millions of others. Are you ready?

The first woman dentist in Toledo, Miss Eva Shapiro, graduate of Western Reserve, is to open offices in this city.

The dental infirmary at Camp Upton, N. Y., is said to be the most complete in existence.

Most forms of bubble-fountains are as dangerous as the common drinking-cup. Never touch lips to the outlet when drinking. Cups should be so made as to drain perfectly after each use.

A fellowship medal was presented to Dr. George H. Wilson, of Cleveland, by the New York State Association at its Golden Jubilee meeting at Saratoga, June 15.

Utah—State

Salt Lake City, June 21.—Dr. H. W. Petty, of Ogdon, was yesterday chosen president of the Utah State Dental Society at the second day's session of the twenty-eighth annual meeting of the organization at the Hotel Utah. D. D. Stockman, of Salt Lake, was elected first vice president; A. Anderson, of American Fork, was elected second vice-president, and Fred W. Meakin was chosen secretary-treasurer.

Ogden was chosen as the convention place of the society next year.

Death of Mr. Gideon Sibley

With deep regret we announce the death of Mr. Gideon Sibley on Sunday, June 23, 1918. The business will continue under the direct supervision of his son Dr. Amos Harrington Sibley.

Important Announcement

Under the provision of the trading with the enemy act the name Procaine was given by the U. S. Government to the drug introduced by the Germans as Novocain, so that the American manufacturers making this drug must now call it Procaine.

The Procaine used in Nontoxo tablets and liquid is being manufactured under Government supervision in America by Americans and is used by the U. S. Government for the Army and Navy.

The chemical name of Procaine as well as Novocain is Hydrochloride of Diethylaminoethyl para-aminobenzoate.

One Half-Million Operations Free

One half-million operations free is the achievement of the Preparedness League of American Dentists. They have pledged themselves to give at least one hour of their time daily, including materials, to men selected for the Army, Navy and Marine Corps. The half-million mark was reached early this month.

The Preparedness League started by Dr. J. W. Beach, of Buffalo, President of the league, is under the direction of Director General Dr. Charles F. Ash, New York, and is being carried on with the approval and co-operation of the Provost Marshal General and the Surgeon Generals of the Army and Navy. Dental colleges throughout the country are contributing their services, equipment and materials to help in the work.

According to the present law, only one dentist is allotted to every 1,000 men in the army. The league is supplementing this work of making recruits dentally fit, by making not only fillings and extractions, but by supplying thousands of crowns and bridges free of charge. In this way, many thousands of men, who had less than the minimum dental requirements to fit them for general military service, are able to be inducted into the service.

It has been estimated that if the mouths of American soldiers be kept clean from diseased teeth, 20% of the men in hospitals because of dental infections, will be available for service in the trenches, and the 20% of extra beds will be available for men wounded in war. Thus, according to the league, not only will the efficiency of the army be increased, but its morale, whereas the government will save the hospital expense which these men would incur.

Statistics from hospitals at the front, announces the league, show that 20% of the men in the sick wards are there because of diseases arising from infections from diseased teeth.

The league has estimated that on the basis of an eight-hour day, the average dentist of the organization gives 12% of his income to his country, plus his materials besides the many civilian contributions which he makes to patriotic campaigns. Some dentists give two and three hours' time daily.

There are 48,664 dentists in the United States, and the league is trying to obtain 100% membership at $1 a year. The only expense is for the distribution of literature and correspondence, which it has been figured out, brings the cost of operation to an average of five cents an operation.

The league is divided into six military departments headed by a director for each department. Each of these directorates in turn is subdivided and managed by a director for each state, under whom are subdirectors for cities and counties. Most of the energies of the league will be devoted to men qualified for military service.

"These are the men," explained Dr. Ash, "who will do the actual fighting and who must live in the trenches, and who consequently are more subject to sickness and infection. The most important thing to do for these men is to rid their mouths of bad roots and infected teeth, or any tooth having a history of periodical abscess. The lack of the minimum number of teeth does not excuse any man from military service, but only from general military service. The man may be accepted for 'limited military service' even if he has no teeth.

"In all the states, dentists have been appointed members of the medical boards, thus enabling co-operation of physicians and dentists. On every local board in the United States, dentists who have volunteered their services have been appointed. It is the duty of these men to examine the mouths and teeth of the registrants and send those certified for general military service to members of the Preparedness League who are prepared to give them free dental service.

"It is inevitable some men will have been sent to camp as certified for class 1-A, who should have been certified for special and limited military service. When such a man is re-examined and sent back from camp, it means expense to the Government and embarrassment to the Local Board. The principal thing the Government is anxious to guard against is injustice to the registrant. Thus if the recruit's teeth are examined thoroughly by the dental representative on the Local Board, the possibility of passing men is very greatly increased."

Winter Exodontia Club No 1

The Exodontists of Minneapolis and St. Paul had their first formal meeting at the Minneapolis Athletic Club May 19, 1918. The guest of honor was Dr. George B. Winter, of St. Louis, the author of "Exodontia," and the originator of a new technic for the removal of impacted lower third molars. Dr. Winter demonstrated the efficiency of his system by removing a large number of impactions, at a clinic, the average time employed being less than one minute.

For recognition of his contributions to science, the club honored him by naming this, the first organization of its kind, for him.

Henry B. Clark president, Carl J. Rice secretary.

Hold Your Liberty Bonds

To successfully finance the war it is necessary that owners of Liberty bonds hold their bonds if possible. Where for any good reason it is necessary for them to turn their bonds into cash they should seek the advice of their bankers.

Liberty loan bonds are very desirable investments, and crafty individuals are using various means to secure them from owners not familiar with stock values and like matters. One method is to offer to exchange for Liberty bonds stocks or bonds of doubtful organizations represented as returning a much higher income than the bonds.

There are various other methods used and likely to be used, some of the goldbrick variety and others less crude and probably within the limits of the law. All offers for Liberty bonds except for money

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A complete course of private instruction in DENTAL ROENTGENOLOGY is offered. Special attention to technic. Address

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In the treatment of suppurative lesions of the gums, wherein stimulating restorative antiseptic influence is indicated, prescribe

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For cleansing and purifying the oral cavity before and after operations on the teeth, a cooling, refreshing spray, wash or gargle is provided by

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As an adjunct to the dental toilet of your patients; as a prophylactic tooth and mouth wash, for daily use, there is nothing superior to

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Booklet "The Teeth and Their Care" emphasizes the importance of frequent consultation with the dentist, and contains useful information for patients; 200 copies, imprinted with professional card, furnished gratuitously.

Dental examination blank combining chart and Notice to Parents, suitable for dentists doing clinical work among school children, also supplied without cost. Dentist's name and address printed thereon.

LAMBERT PHARMACAL COMPANY

Twenty-first and Locust Streets St. Louis, Mo., U.S.A.

and at market value should be scrutinized carefully. The bonds are the safest of investments and have non-taxable and other valuable features.

To hold your Liberty loan bonds, if possible, is patriotic. To consult your bankers before selling them is wise.

An important change has been made by the board of directors in the admission of children for treatment at the Rochester Dental dispensary. It has been found upon investigation that the per capita allowance for $5 for treatment, established when the dispensary was opened last October is not enough to bring the benefits of the institution to many children. The rule has been changed so that a family of two having an income of $15 a week, a family of three with an income under $20 a week, and a family of four having an income under $24 a week may receive treatment. The per capita allowance of $5 a week for each member of a family in excess of four still remains.

DEATHS

At East Oakland, Cal., June 26, Dr. W. C. Mobley, of heart trouble, aged 56.

At Brockton, Mass., July 2, Dr. Lorng W. Puffer, aged 70.

At Rochester, N. Y., July 1, Dr. Charles H. Whitlock, of Clifton Springs.

At Arlington, Mass., June 13, Dr. Charles Davis Cobb, of apoplexy, aged about 40.

At San Antonio, Texas, June 23, Dr. Isadore Freshman was fatally shot by the accidental discharge of a pistol in the hands of a friend. He was but 21 years old.

At Goshen, Ind., July 11, Dr. J. W. Stage, aged 47.

At Brooklyn, N. Y., June 29, Dr. Lonedo Frazee, aged 73.

At Arlington, Boston, Mass., June 13, Dr. Charles D. Cobb, aged 51.

Allotment to dependants of United States soldiers have increased from 10,000 at the beginning of the war to 800,000. For the month of May these allotments total $5,000,000. Thirty thousand commissioned officers are allotting $1,000,000 a month to their families; non-commissioned officers and privates, $4,000,000.

In addition nearly $50,000 000 of Liberty loan bonds of the second Liberty loan will have been paid for by members of the Army and will be turned over to the purchasers during August, the payments having been made out of allotments made for the purpose.

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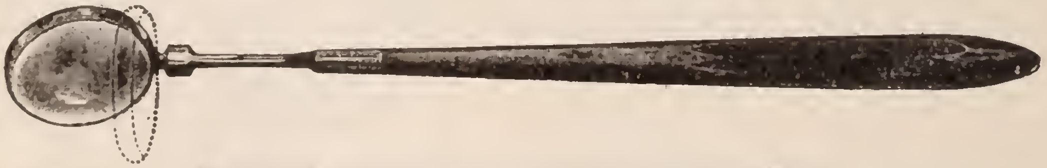

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Dental Bulletin July 1918
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WILLIAMS

? ? ? ? ? ? ?

I wish I had sense enough to impress upon every reader the positive necessity for really rigid food conservation, which, I have reason to fear, has not as yet penetrated the consciousness of more than a tiny minority of Americans, the most of whom still conduct their private commissary department upon the outworn and always mistaken theory, that every man has the right to all the food that he wants if he is able to pay for it. Here are a few facts that may help:

Since the beginning of the ravages of the unspeakable Hun, in the countries overrun by him, and in his own country and those of his allies—Germany, Austria, Hungary, Turkey, Bulgaria, Serbia, Roumania, etc., four million, seven hundred and ninety thousand (4,790,000) men, women and children have STARVED TO DEATH! Understand? THEY HAVE STARVED AND STARVED AND SUFFERED AND MOANED AND CRIED UNTO THEIR GODS AND HAVE BEEN UNHEARD OR UNHEEDED UNTIL THEY HAVE DIED, mere, miserable bundles of skin and bones.

Can you realize the meaning of this statement? Think of every man, woman and child in the city of New York being put to death by the slow, lingering tortures of starvation. Have you ever been hungry? I do not mean merely hungry to the point of a good appetite for the next meal; but hungry to the point of griping pain, of wrenching emptiness, when there was no food. I HAVE, and I know. And if there is anything in this world that gets under my skin it is the thought that anybody else should be hungry as I have been. It simply "annexes my Capricornus." Think of these people, growing thinner and weaker, losing all sense of right and wrong, fighting like beasts among themselves for the little food there was, and finally collapsing in death for want of the food that millions of good, clean, loyal Americans WASTE, literally throw away, every day of their lives! If you realize this thing, can you possibly waste a morsel of food?

Think what a crust of corn-bread, think what an apple-core, think what a bit of gristle, or a burned pan-cake, or an overdone biscuit, or stale eggs and steak—think what these "uneatable" things that we toss into the garbage without a thought, think, try to realize, just what these things would have meant to these poor people. Then think of that extra piece of pie, that second helping of meat, that additional egg, that ice cream and cake that you forced yourself to eat, that you knew that you did not need—more, that you knew positively was not good for you, think of all these things that were a hundred times worse than wasted, and then ask yourself—

"WHAT AM I GOING TO DO ABOUT IT?"

It is what you DO about it, not what you think, that counts. Do you spend more than you should for your lunch downtown? Are you paying more than half as much for it as you were before the war? Are you doing anything at all to reduce your consumption of food, the consumption of your family? Is your waist-line growing or shrinking? Are you still ashamed to carry a lunch-box with you to the office, or a sandwich or two wrapped in paper in your pocket? Are you still nursing the petty vanity that such things are beneath the man of your standing?

If you are, for the sake of common sense, for the sake of our common humanity, for the sake of the World's Saviors who have given and are giving their lives and all that they have and are for the Great Cause, WAKE UP! COME OUT OF IT! If you don't, the time may come when you will see the war lost for want of food; when the Hun will roost in your nest befoul with his vile touch all that you hold sacerd and holy, and gorge himself on the food that you might have used to beat the dirty beast into the earth where he belongs.

Fix this fact in your mind: If the allies are fed, WE, here in North America, must feed them. No matter what the Argentina may yield; no matter what Australian harvest may produce; the surplus of these countries cannot be transported to Europe. Upon the United States and Canada devolves the stupendous task. There is not enough shipping in all the world to transport food from Australia or Argentina.

Remember this: There's not a child in England, nor in France, nor in Italy, that can now have all of the food that it needs —NOT ONE! What about your children? Are you reducing their vitality, are you mortgaging their future by giving them far more than they should have?

All the people of Great Britain, of France, of Italy, of Belgium are today on mere sustenance rations—which means that they are getting just enough food to keep them above the point of starvation.

WHAT ARE YOU DOING ABOUT IT? WHAT DO YOU INTEND TO DO ABOUT IT?

Just a little less each meal—not less than you need, but less than you can stuff in; just a few ounces saved each day, is all that is required.

Remember that all the food for all the world is in one market basket; and that waste anywhere means want somewhere.

Think! Realize! Act!

Ohio—Rehwinkle

Circleville, O., June 27.—The session of the Rehwinkle Dental Society, composed of dentists from Pickaway, Pike, Ross, Highland, Fayette, Jackson and Clinton counties, held in this city Thursday afternoon and evening, proved one of exceptional interest and profit to the members.

The session was brought to a close Thursday night with a banquet at the Cherry hotel followed by a number of after dinner speeches from various members of the association.

The program was carried out as originally planned with a number of papers and discussions, including a paper and clinic by Dr. M. E. Niswonger, of Dayton, on 'The Selection of Teeth and Their Natural Arrangement for Full Denture;' 'Taking Care of the Teeth of the Draftee;' given by Dr. E. B. Tizzard, of Dayton; 'A Case of Carcoma,' by Dr. C. V. Lanum, of this city, and table clinics by Dr. A. J. Lewis, of Dayton; Dr. L. E. Custer, Dayton; Dr. Z. N. Wright, Dayton; Dr. Oliver, of Dayton, and Dr. Fuller, of Dayton.

The election of officers resulted as follows: President, N. G. Phillips Chillicothe; first vice-president, A. M. Bush, this city; second vice-president, O. A. Thompson, Hillsboro; secretary, Fred D. Wollard, and treasurer, W. E. Robinson, of this city."

Classified Advertisements under this heading, $2.00 each for 60 words or less: additional space, 2 cents per word, single insertion; three insertions or more, special rate on application.

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REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS
Vol. XXXVIII September, 1918 No. 9

NASMYTH'S MEMBRANE, EPITHELIAL DEBRIS, AND THE GRANULAR LAYER OF TOMES.*

EUGENE S. TALBOT, M.D., D.D.S., CHICAGO.

FOR MORE than a hundred years scientists have speculated on the etiology and function of Nasmyth's membrane. Within the last twenty-five years, epithelial cells in the peridental membrane have caused considerable discussion in our modern textbooks, while the granular layer of Tomes has not received the attention that its pathologic conditions demand.

On account of the interest lately manifested in focal infections and the imperfect operations on devitalized teeth, I have spent a number of years doing research work on teeth of animals and human beings. The amount of material at my disposal has been unlimited. The Cook County morgue has furnished me with human material, while the kennels and laboratories at Rush Medical College have provided more than the required number of dogs. Instead, therefore, of basing my conclusions on one tube or one slide, hundreds of sections were cut and mounted for microscopic study.

While this work was going on, questions regarding histology frequently arose and required investigation. For this purpose human embryos and very young children were required. This material was more difficult to obtain. "Where there is a will there is a way," and so the machinery was put in motion and abundant material was obtained. The result of all this work will be published in book form. A part of this work, however, is so unique, important and original that I feel it should be given to the profession at the earliest opportunity. Hence, my reason for appearing before you at this time.

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*Read before the Section on Stomatology, at the Sixty-ninth Annual Session of the American Medical Association, Chicago, June, 1918. The Dental Summary is the representative organ of this Section for the dental profession, by special arrangement with the Jour. Amer. Med. Asso.

While Nasmyth's membrane, epithelial debris and the granular layer of Tomes have much to do with the pathology of the teeth and the alveolar process, our textbooks seem unable to cope with the etiology or pathology of the apical dental tissues. In my researches on these tissues in both animal and human subjects, I accidentally hit on the source of these pathologic conditions, and now present them through this society to the profession.

Fig. 1 shows the development of the crown of a human cuspid tooth at birth. The different tissues are readily seen. The dental papilla has taken its place and the outline of the tooth to be formed. The enamel organ is forming itself about the papilla. It seems, however, to have pulled away from its normal position on both sides at the neck in the preparation of the material for the microscope. The two dark lines representing the inner and outer layer of epithelial cells are nicely outlined, and between these two layers may be seen the stellate reticulum. Note that the epithelial cord is being absorbed away regardless of the fact that the fibrous sac has not come in contact with it.

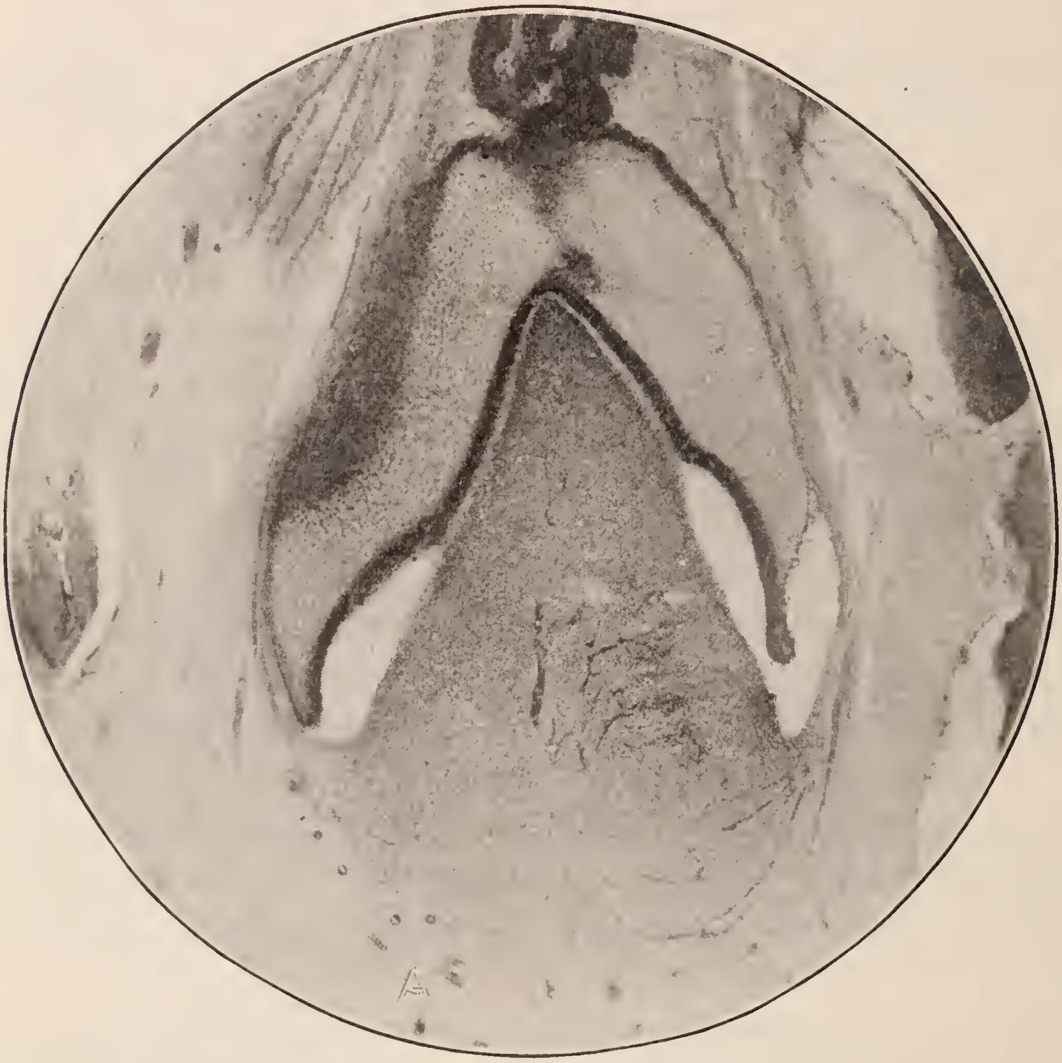

Fig. 1.—Development of an inferior human cuspid tooth at birth: A, nidus of arteries which furnish material for the formation of the tooth structure; × 34.

It would seem, therefore, and this picture actually demonstrates, that it is not the fibrous tissue of the dental sac that causes absorption of the epithelial cord, as we always have been taught to believe.

At the base of the papilla where the fibrous sac will eventually develop may be seen a nidus of arteries which furnish blood for the nourishment of the dental tissue until it is fully formed. This nest of arteries always marks the location from which the dental papilla forms, including the root of the tooth. In other words, the nidus of arteries is always the base, no matter how long the tooth and the root may be.

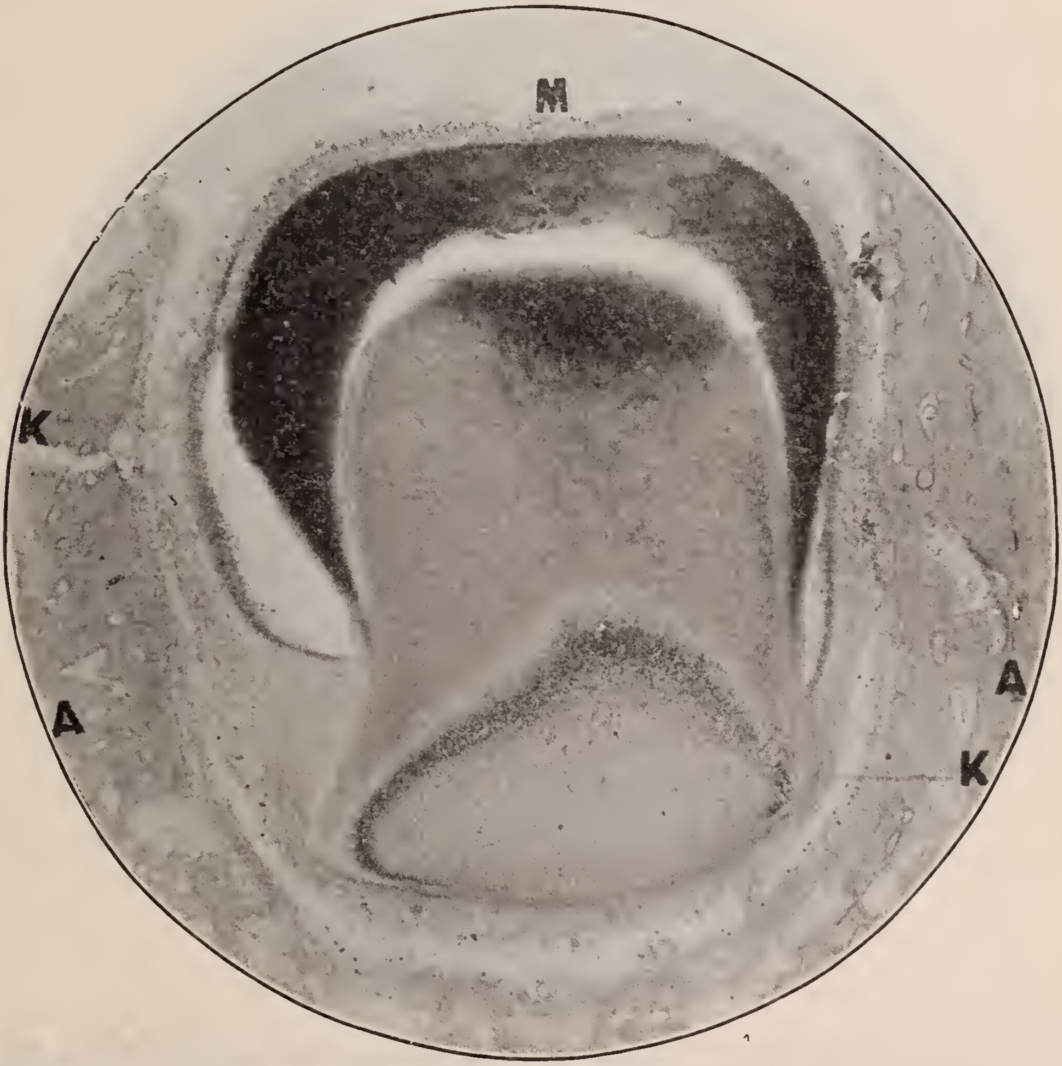

Fig. 2.—First inferior premolar of a dog: A, alveolar process; K, fibrous sac; M, external epithelial layer of the enamel organ; × 24.

Details are lost to a great extent in this picture for the purpose of obtaining a large area of structures to show their relationship one to the other. This picture, then, is the characteristic picture of the development of a tooth as shown in our various textbooks. It will be seen that this picture has simply to do with the crown of the tooth and not with the development of the root, which is so necessary in the study of diseases associated with it. It is, therefore, from this period to the full development of the root of the tooth that my researches and this paper have to deal.

Fig. 2 is also of a low magnification for the purpose of showing all the tissues in relation to one another. It is claimed by most writers that the external epithelium of the enamel organ is atrophied before the time of the completion of the enamel. Thus Magitot[1] states that the external epithelium of the enamel organ is atrophied before the time of the completion of the enamel. Tomes is also of the same opinion. This picture splendidly demonstrates that this theory is not correct. The enamel is completed in its development. The external epithelial layer is beautifully shown extending from the neck of the tooth entirely around its outer surface. At the lower borders at the neck of the tooth the external epithelial layer of the enamel organ is situated quite a distance from the enamel, while across the entire crown it is in close contact. The entire tooth is pushing its way toward the surface as the root develops.

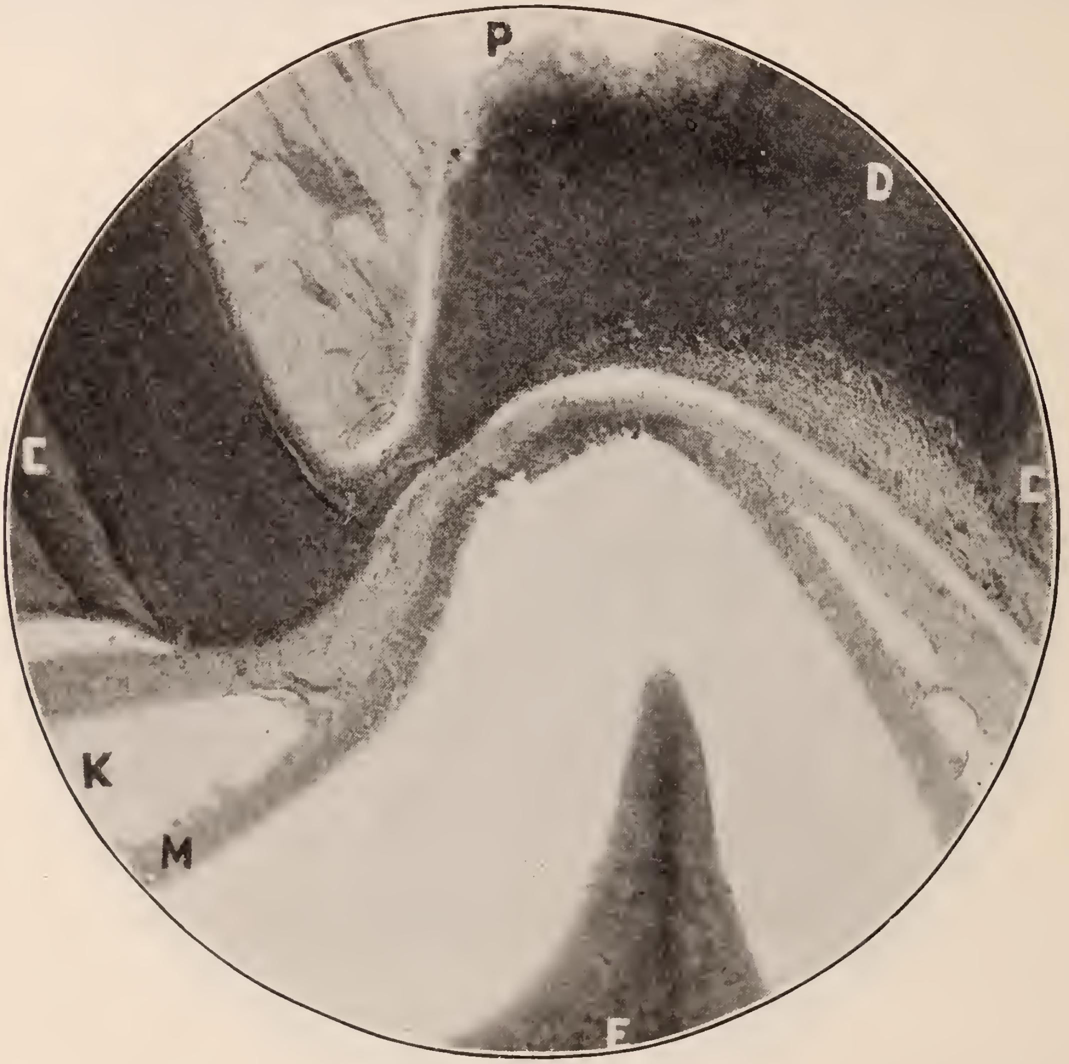

Fig. 3.—An area between the crown of a permanent tooth and the root of a temporary tooth of a dog: C, cementum; D. dentin; E, enamel of the permanent tooth; K, fibrous sac; M, external epithelium; × 40.

To demonstrate further the correctness of this fact, I present *Fig. 3*, showing the temporary premolar tooth of a dog about 1 year old, in position and the permanent tooth erupting, causing absorption of the root of the temporary tooth. The crown of the permanent tooth, including the enamel, is completely formed and is pushing its way by absorption into place. The external epithelial layer of the permanent enamel organ is nicely shown next to, but some distance from, the point of the tooth. Outside the epithelial layer partly attached to, and partly removed from it, may be seen the fibrous sac of the permanent tooth in contact with the absorbed roots and alveolar process of the temporary tooth. The alveolar process, the cementum, the dentin and pulp of the temporary tooth are shown. Osteoclast absorption can also be readily seen. I have hundreds of sections from dogs and human beings to demonstrate that the external epithelial layer remains intact until the eruption of the tooth through the alveolar process.

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[1] Magitot: Dental Anatomy, Tomes, pp. 93.

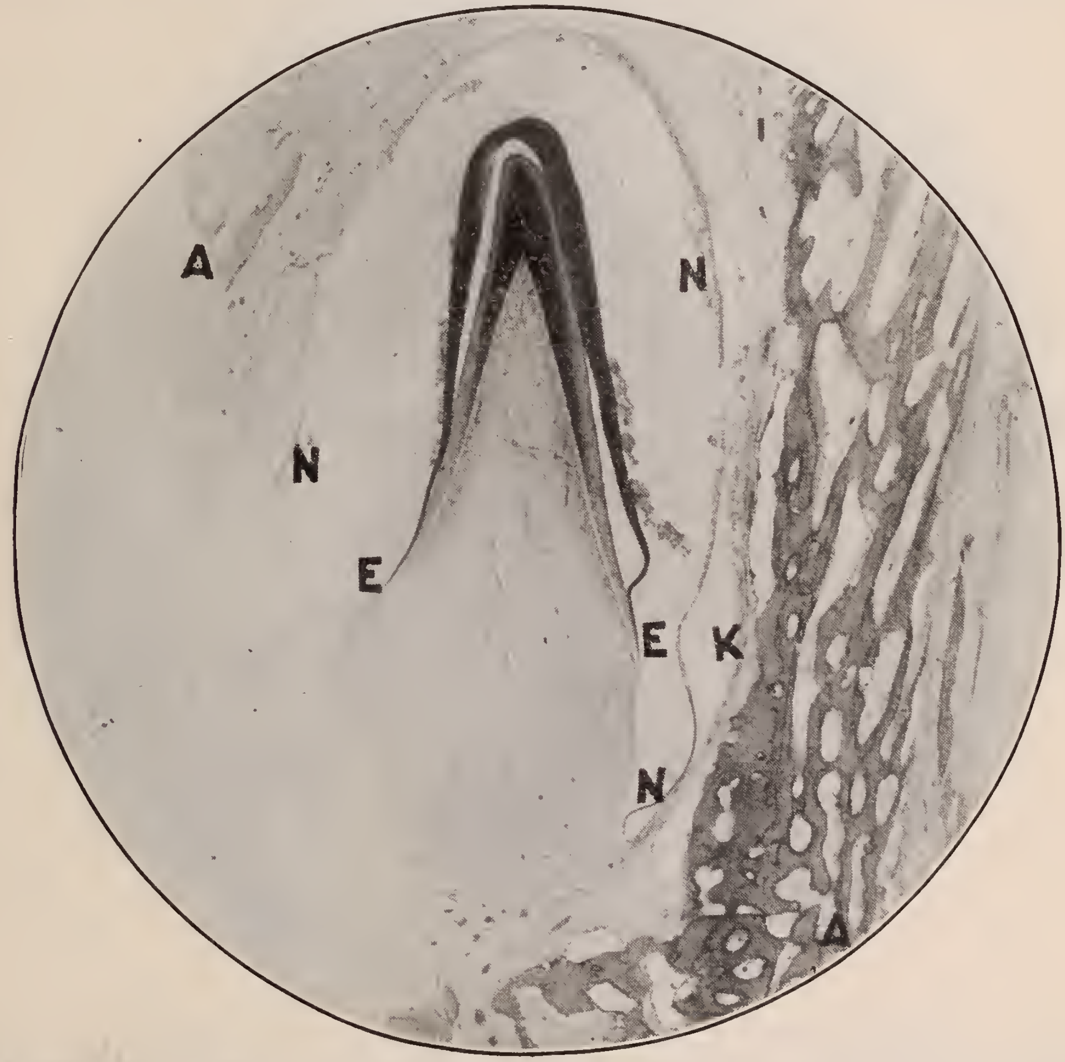

Fig. 4.—An inferior central incisor at birth: A, alveolar process; E, end of the enamel; K, wall of the sac; N, external epithelial layer; × 13.

To show further that the external epithelial layer and the fibrous sac do not always absorb away until the eruption of the tooth, the following case in practice will demonstrate:

A boy, aged 14 years, had erupted all the permanent teeth with the exception of the right inferior second bicuspid. All of the temporary second molars remained in the jaw longer than usual. They were extracted before they became loose in order that the bicuspids might erupt at their proper period. When the temporary right second inferior molar was removed, the bicuspid did not erupt, although there was plenty of room between the first bicuspid and the first permanent molar. A bright red membrane was present over the bicuspid crown after the temporary tooth had been removed. This condition remained for eighteen months. I finally excised this tissue, and the tooth developed into position. When this tissue was placed under the microscope the two layers, one the external epithelial, the other the fibrous sac, were distinctly seen. Either there was insufficient energy exerted in the bicuspid tooth to absorb these two membranes, or the fibers of the sac were so dense and strong that the tooth could not push its way into position. All of us have observed similar conditions in our own practice.

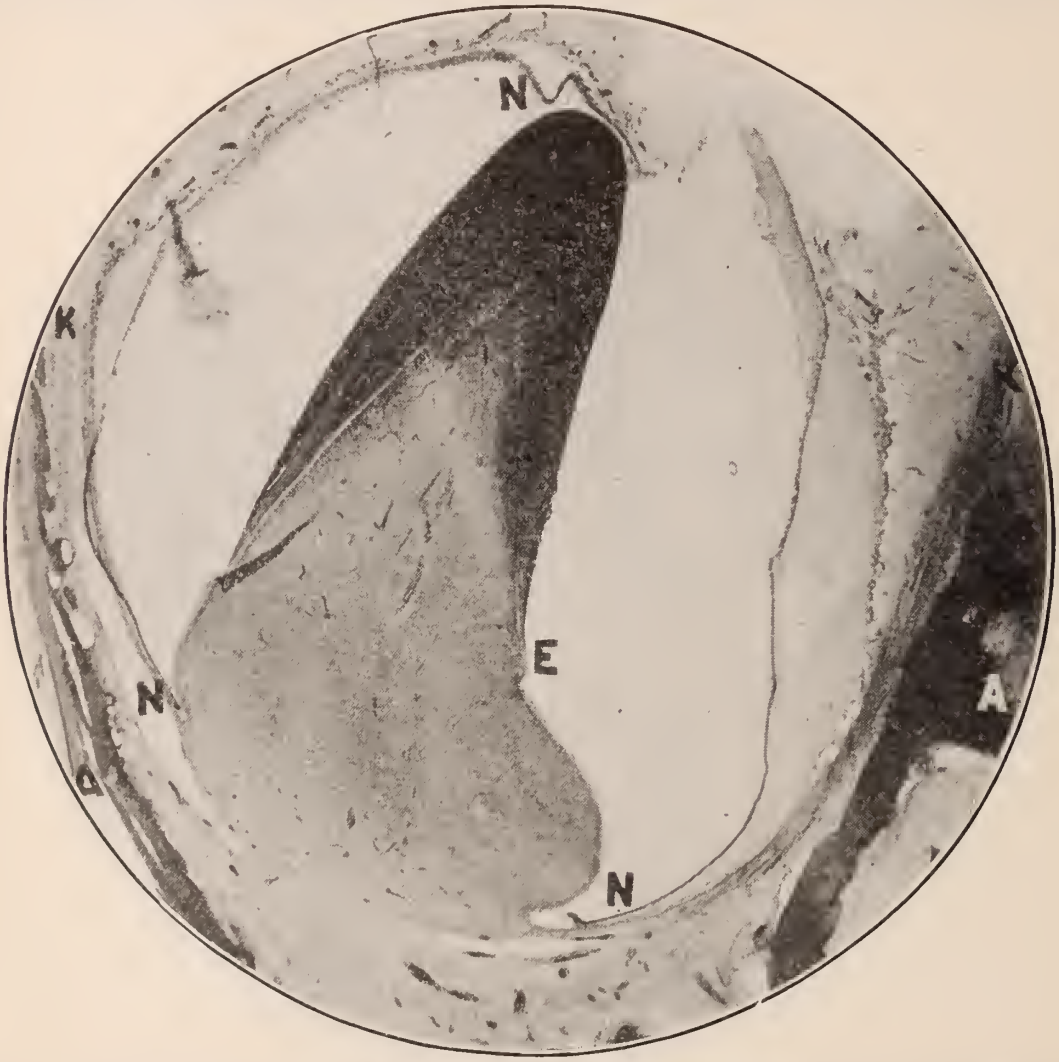

Fig. 5.—Developing incisor of a child at birth: A, alveolar process; E, edge of the enamel and neck of the tooth; K, fibrous sac enclosing the dental tissue; N, outer layer of enamel organ; × 15.

As it has been shown conclusively that the external epithelium may and does outlive the development of the enamel until after the eruption of the tooth, we are now prepared to trace its erratic development through its future career. We have seen in former pictures that even after the enamel has begun to form, the external epithelium retains its connection at the neck of the tooth until it has completed its development. As soon as development of the enamel has become completed, the epithelial cells of the internal layer and the material composing the stellate reticulum have exhausted themselves. The external epithelial layer, therefore, has severed its connection with the internal layer at the neck of the tooth, and, the end of the external layer being free, it drops into space or attaches itself to the inner surface of the dental sac, the end of the external epithelial layer resting at the junction of the sac and the root of the tooth.

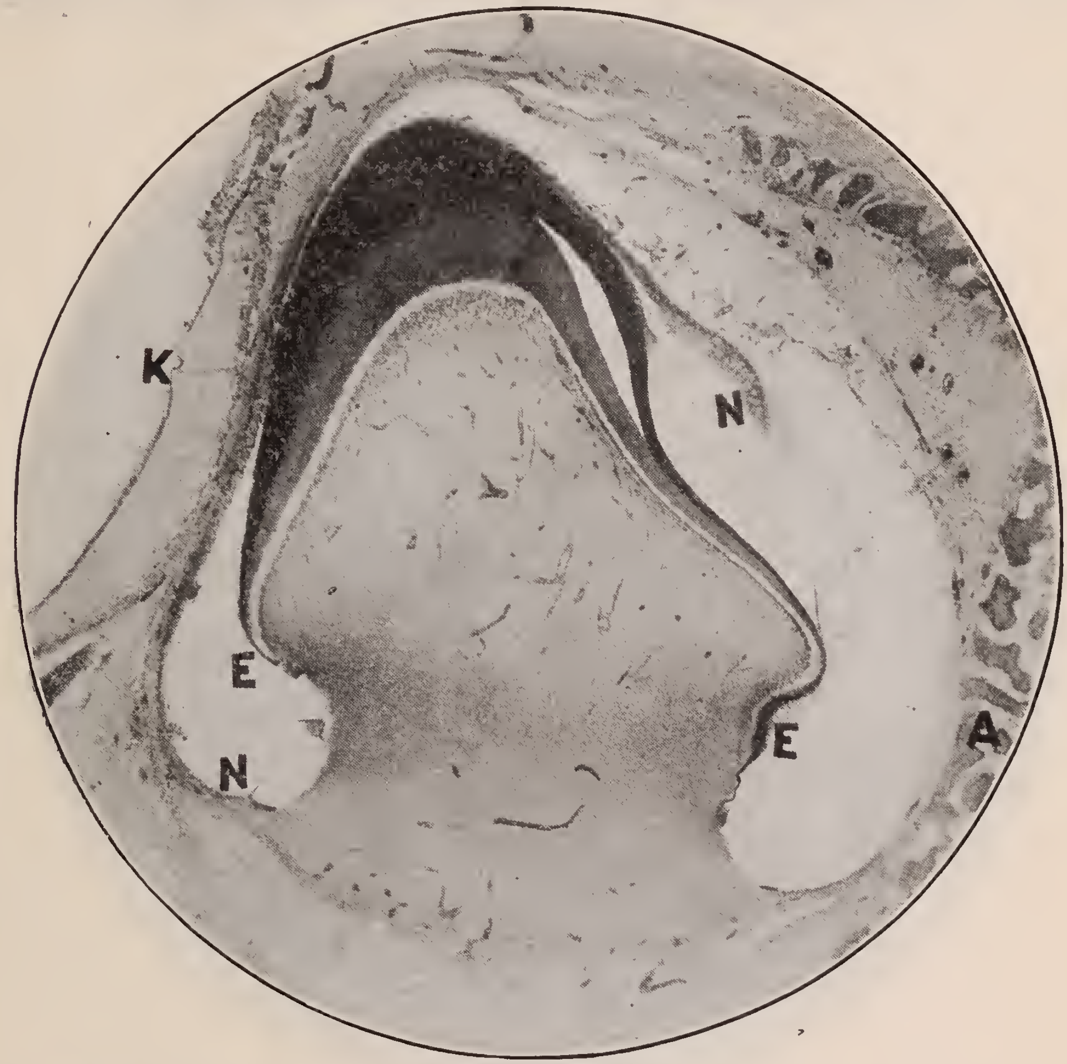

Fig. 6.—Developing superior cuspid tooth of a child at birth: A, forming alveolar process; E, edge of enamel at neck of tooth; K, sac wall; N, external epithelial layer; × 18.

Fig. 4 shows the development of an inferior central incisor at birth. While this specimen was being prepared for the microscope, the posterior part of the alveolar process was destroyed. Enough tissue remains, however, to show the development of the root of the tooth. The nidus of arteries at the base of the papilla is located quite a distance from the neck of the tooth, as compared with *Fig. 1*, showing that the root of the tooth has developed nearly one-half its length. The edge of the enamel shows the location of the neck of the tooth. The external epithelial layer originally extended to that locality before severing its connection with the internal layer. Note that the end of the external layer now rests at the base of the papilla at its junction with the dental sac. Not that the external epithelial layer has grown in length, which it is capable of doing, but in the development of the root of the tooth, the crown and the root have grown upward from the base where the arteries are located. At places along the external epithelial layer dead cells are given off where it does not receive nourishment from the fibrous sac. Quantities of dead cells have migrated from the external epithelium and are located on the enamel on both sides of the crown. Where the external epithelium has obtained its nourishment from the sac wall, the cells are in a comparatively normal healthy condition.

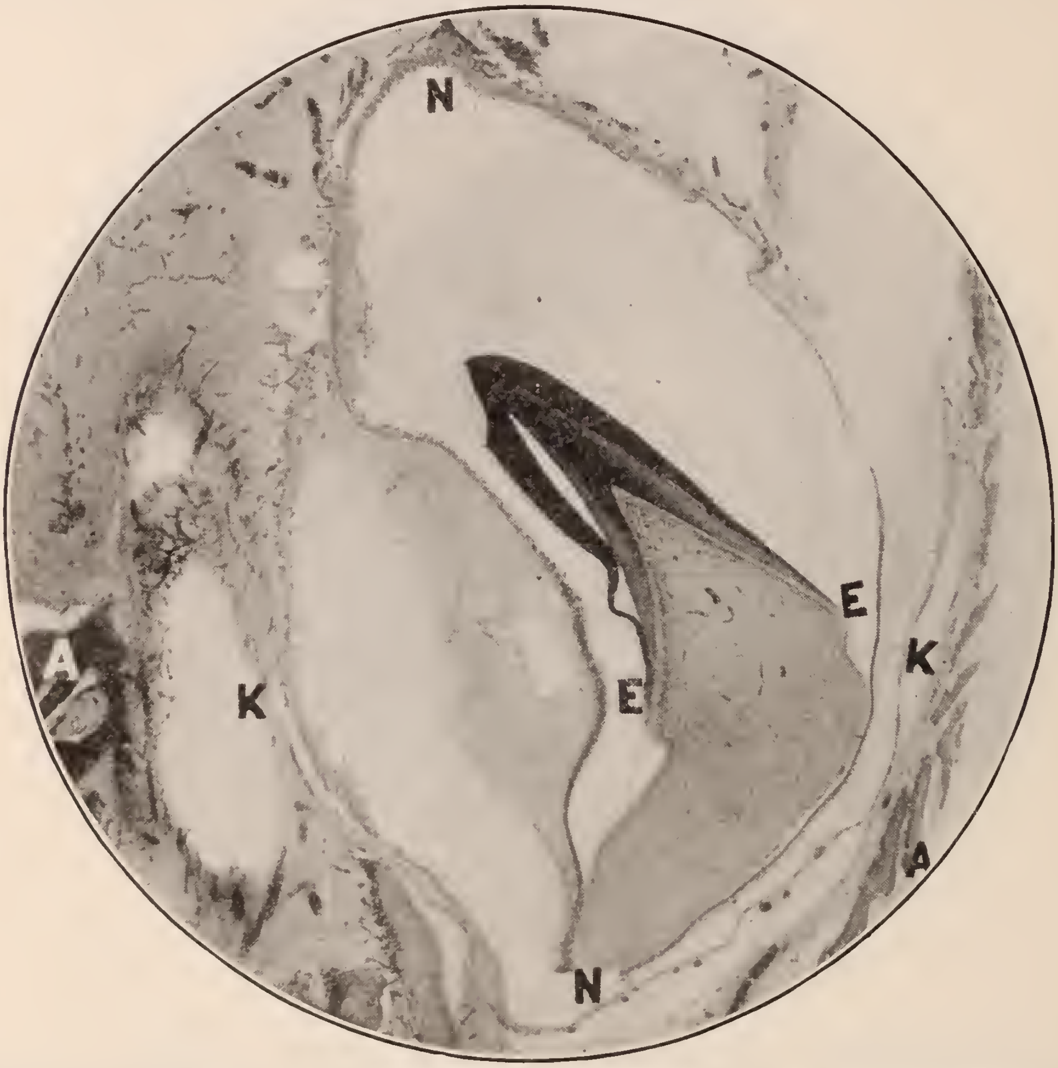

Fig. 7.—Completed root: A, alveolar process; E, end of enamel; K, wall of sac; N, external epithelial layer; × 16.

Fig. 5 shows another incisor crown with the enamel normally developed. The internal epithelial layer and the stellate reticulum have entirely disappeared, while the external epithelial layer is still located on the inner surface of the dental sac. The edge of the enamel both anteriorly and posteriorly is distinctly outlined. The external epithelium has dropped down to the junction of the papilla and the fibrous sac, which is also readily seen. The distance, however, between the end of the external epithelium and the edge of the enamel is quite marked. This is the root of the tooth. Here again details are sacrificed to obtain a large area to show the relation of the different tissues to each other. The nest of arteries, however, at the base is readily observed. Like the other pictures, these arteries were originally located at the base of the crown, as seen in *Fig. 1*.

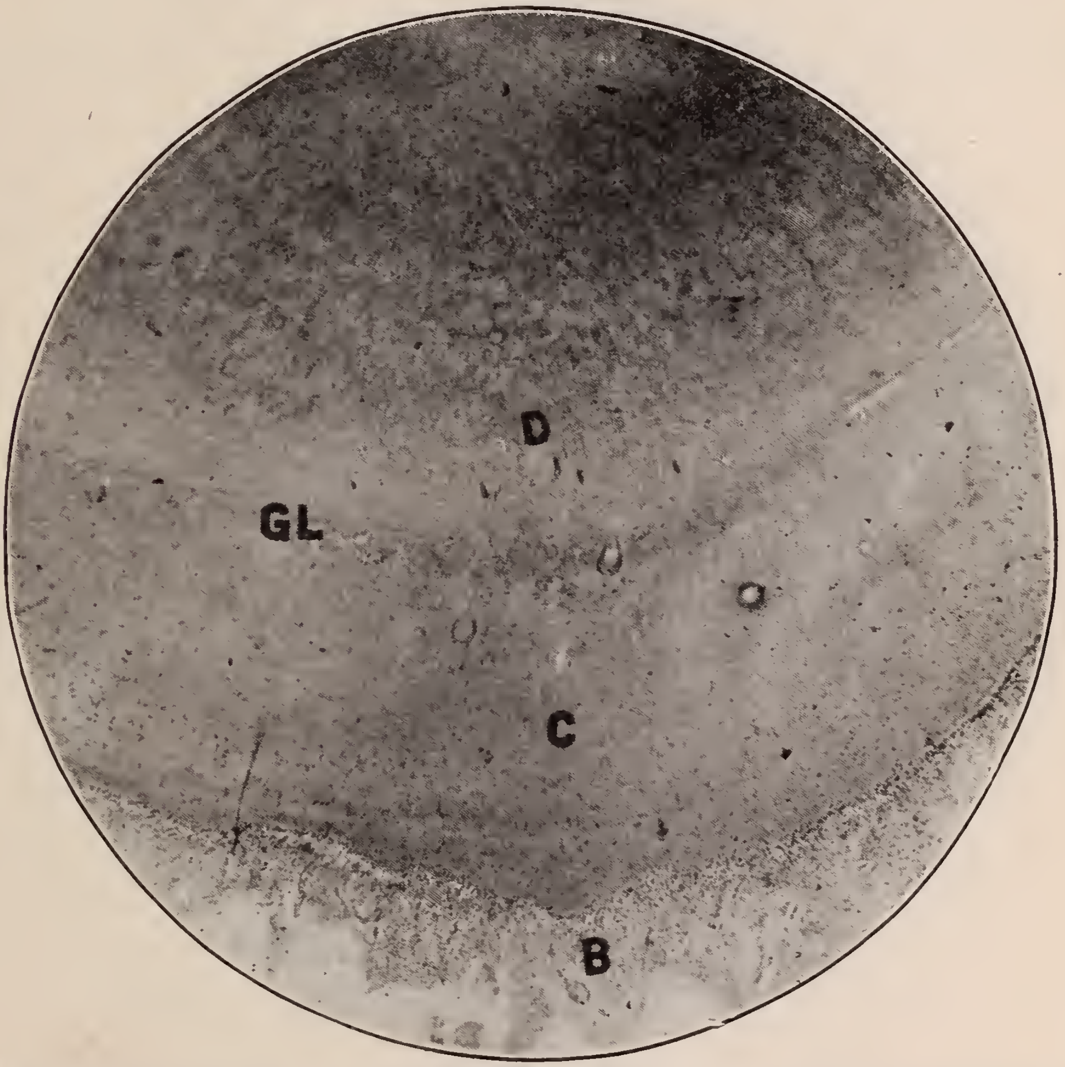

Fig. 8.—End of root of molar tooth of dog: B, peridental membrane; C, cementum; D, dentin; GL, granular layer of Tomes, × 40.

The root of the tooth developing from the base has carried the crown of the tooth toward the surface. Hence the difference in location of the ends of the external epithelium and the edge of the enamel. It is well to call attention at the present time to the dark spot in the fibrous sac outside the external epithelium. Note that bone has not yet developed at that locality. The part of the external epithelium that is nourished by the fibrous sac sends out healthy normal epithelial cells, which migrate in all directions in the fibrous sac. Sometimes they are single, sometimes two or more are together, and they form themselves into different shapes. Sometimes they are in rows and sometimes they form cylinders like a gland. These will be shown more clearly later on. Carry in your mind's eye the end of the external epithelium where it turns on itself at right angles at the right of the picture. This locality will be shown by a higher magnification later.

Fig. 6 shows another human tooth developing at birth. The distance between the edge of the enamel and the nest of arteries at the base is readily outlined. The external epithelium at the right has been partially destroyed for want of nourishment, and the dead epithelial cells are scattered in the space. At the left the external epithelial layer extends down to the junction of the fibrous sac and the dental papilla. Here again, epithelial cells shown by the dark spot have migrated outside the external epithelium into the fibrous tissues. New bone is developing at the right which will eventually encroach on the soft tissues.

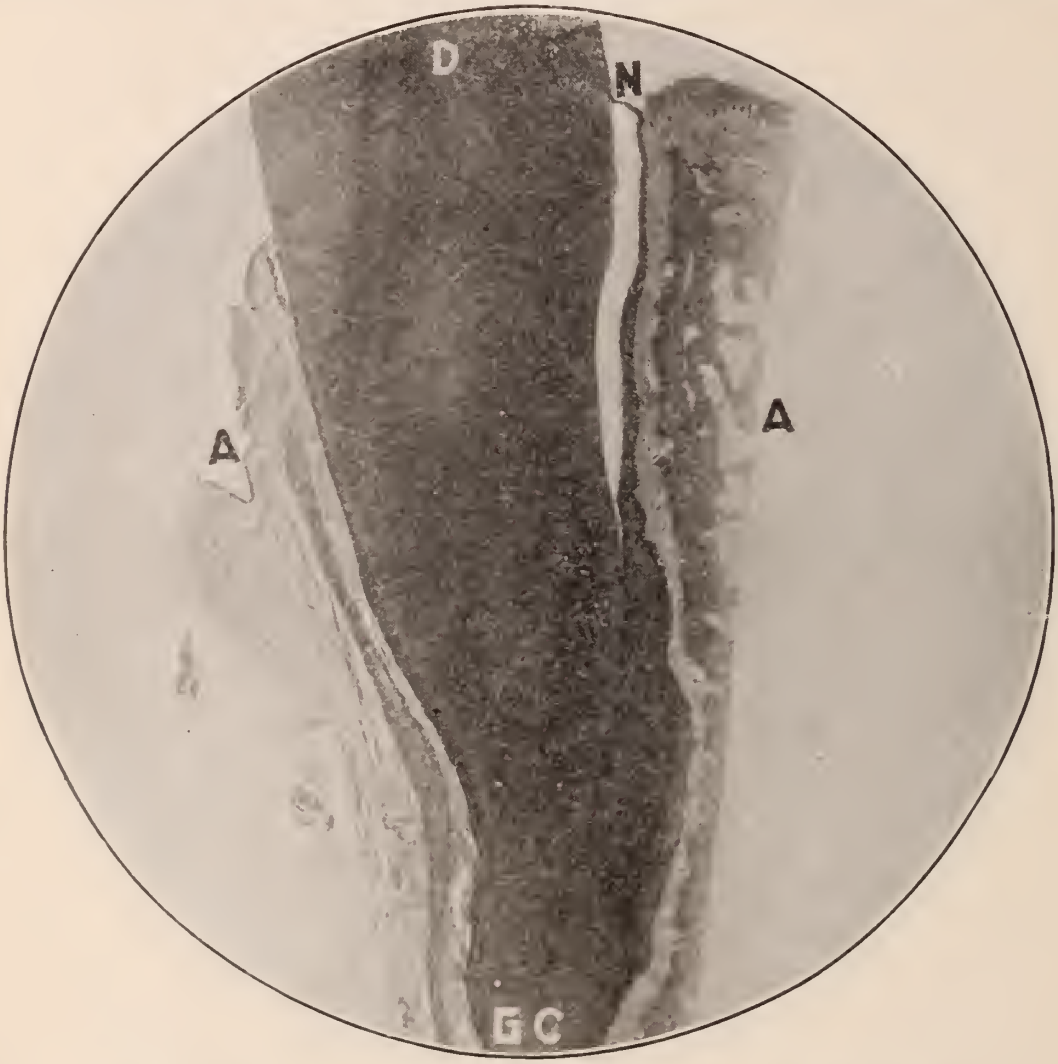

Fig. 9.—Cuspid tooth from a man, aged 37: A, alveolar process; C, cementum; D, dentin, G, granular layer of Tomes; N, Nasmyth's membrane; × 6.

Fig. 7 shows the entire development of the root of the tooth. The neck of the tooth can be easily outlined at the edge of the enamel. The enamel is completely formed, the dentin still developing. The ends of the external epithelial layer, originally located at the end of the enamel at the neck of the tooth, now are located, as shown in the other illustrations, at the junction of the papilla and the fibrous tissue of the sac. In this case in the laboratory treatment it has been torn away at the end of the root from the fibrous sac; hence the reason for the two edges not coming together and completing the circle around the dentin. At the upper border outside the external epithelial layer, epithelial cells which I have called "epithelial debris"[2] may be seen migrating into the fibrous tissue.

It will be noticed that the external epithelial layer is located between the dentin papilla and the dental sac, or follicle. As the dental sac adapts itself to the formed dentin, the external epithelial layer is molded to the outer surface of the dentin and the inner surface of the sac.

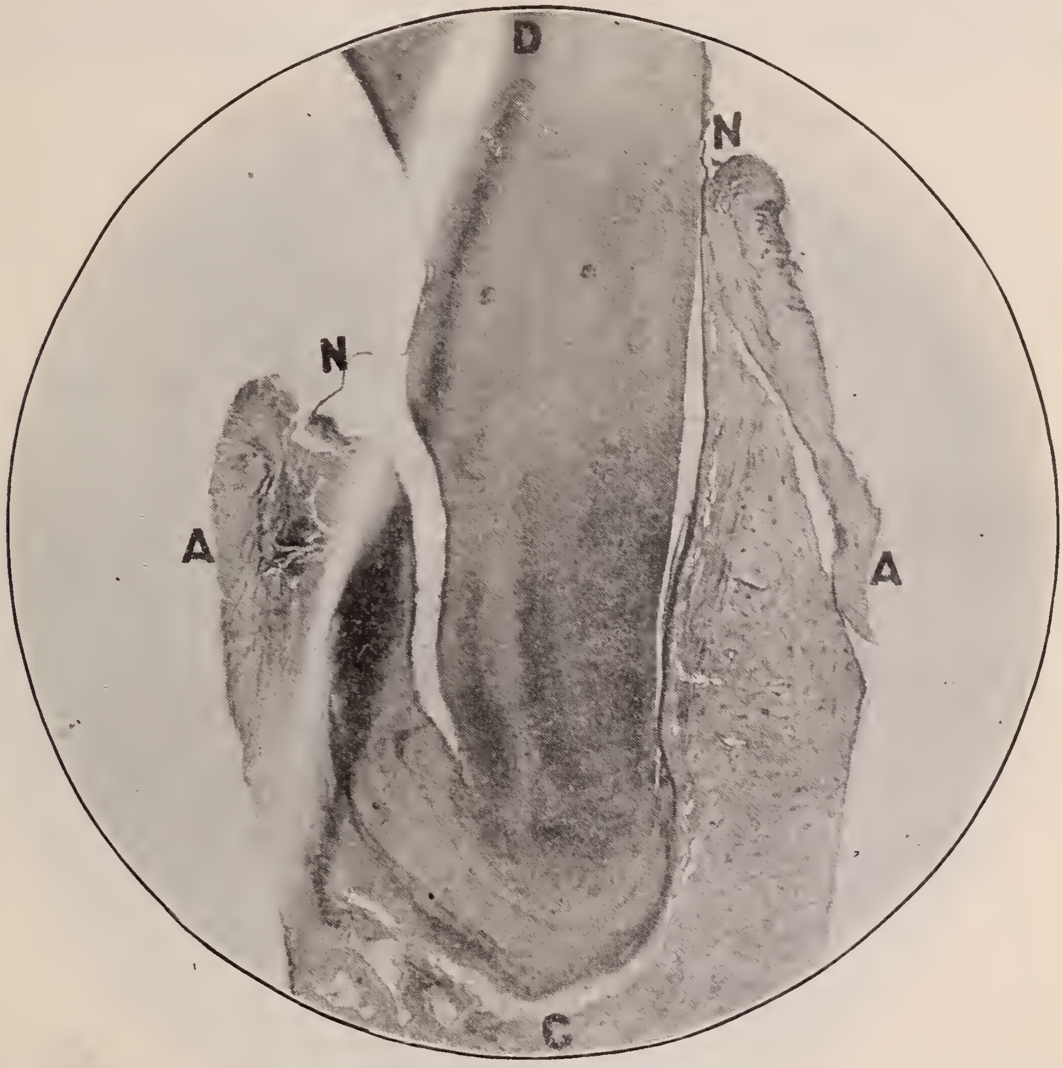

Fig. 10.—Root and alveolar process of a human cuspid tooth: A, alveolar process; C, cementum; D, dentin; N, Nasmyth's membrane; × 8.

The sac wall eventually becomes the peridental membrane, which develops the cementum. Naturally, if the external epithelium extends below the neck of the tooth, cement substance is deposited on the epithelial layer and not on the dentin. As we have shown, sometimes the epithelial layer stops at the neck of the tooth, sometimes midway along the root, and frequently it extends entirely around the dentin. Sometimes the epithelial cells are destroyed for want of nourishment. Again, not infrequently the epithelial layer does not adapt itself smoothly to the dentin, and loops are formed; in this manner we obtain the granular layer of Tomes to a smaller or larger degree. The following illustrations show my contention in this regard.

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[2] Talbot, E. S.: Interstitial Gingivitis or So-called Alveolaris, 1899.

Fig. 8 shows the end of the root of a dog's tooth. Between the cementum and the dentin is seen the granular layer of Tomes. Spaces are noticed throughout the entire distance, some small and others quite large. These spaces contain protoplasm and the debris from the external epithelial layer.

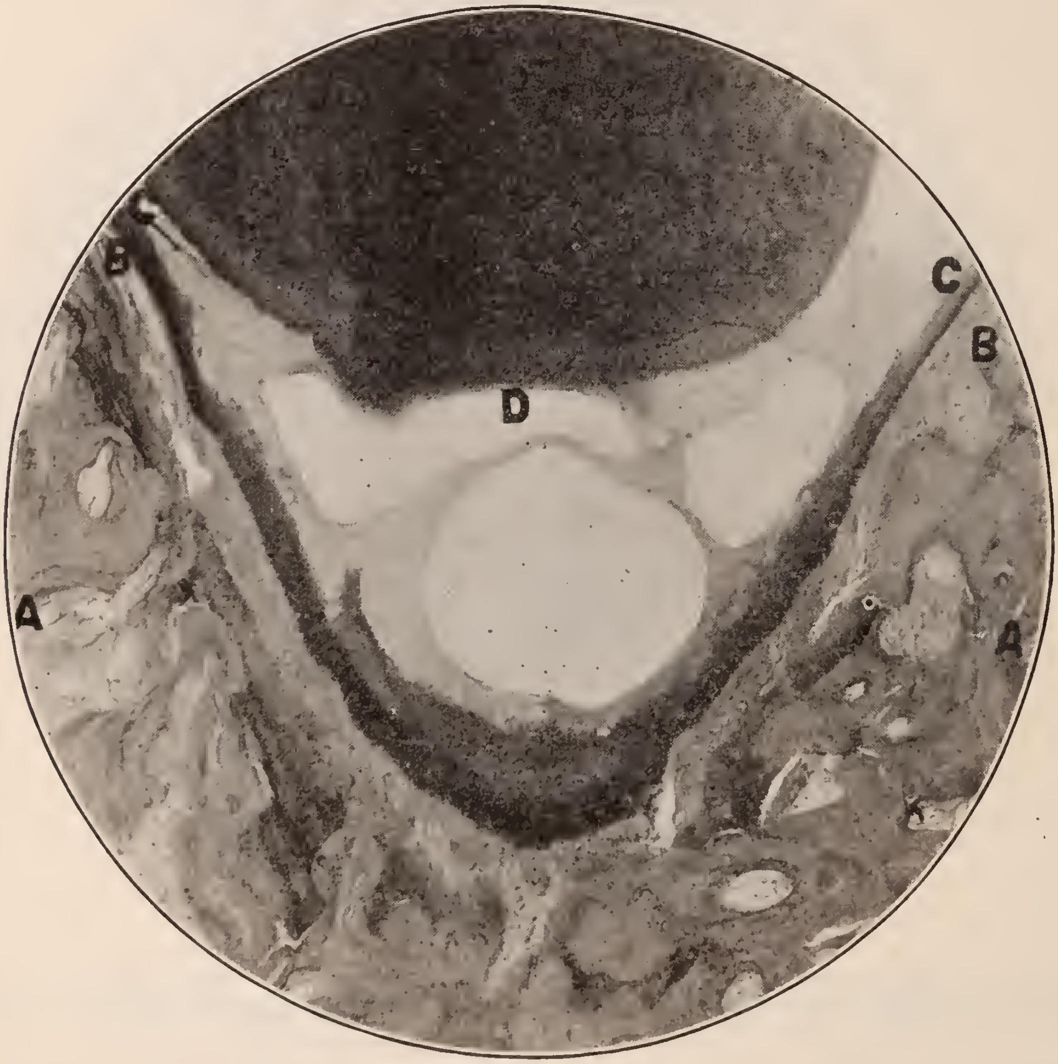

Fig. 11.—End of root and alveolar process of a human bicuspid tooth: A, alveolar process; B, peridental membrane; C, cementum; D, dentin; × 23.

Fig. 9 is the entire root of a cuspid tooth with the alveolar process of a man, aged 37. This is a very low magnification in order to show all the structures in position. The details, therefore, in a measure are lost. In following the external epithelial layer from the gum margin at the right from the dentin across the space to the alveolar process, it can be traced down one-half the length of the root, at which point it becomes attached to the dentin and passes diagonally downward across the root and to the opposite side. Near this locality may be seen a small opening, originally an artery. This is the granular layer of Tomes. The large mass of material outside the granular layer is cementum.

Fig. 10 is a similar reproduction of a very low magnification of a first bicuspid taken from the same mouth. This picture shows the details much more clearly. The external epithelial layer can be traced from one side of the crown down the entire length of the dentin around the end of the root, up the opposite side, and back to the crown. The cement is located outside the epithelial layer and the granular layer of Tomes. We shall see later that this external epithelial layer becomes a part of Nasmyth's membrane.

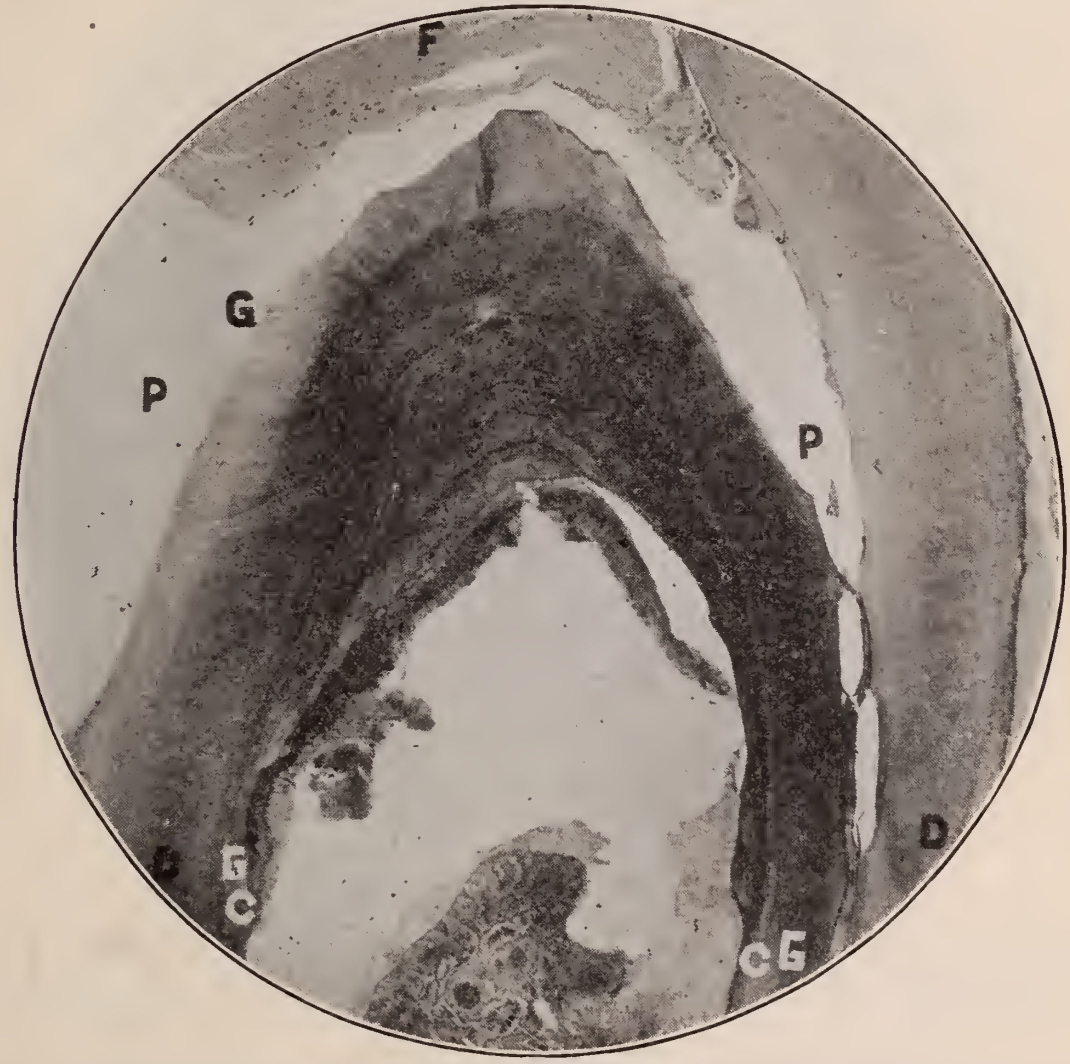

Fig. 12.—Human inferior second molar: C, cementum; D, dentin; F, filling material in pulp chamber; G, granular layer of Tomes; P, pulp canals; × 13.

To appreciate the position of this epithelial layer and its relation to the dentin and cementum, I present *Fig. 11*. This is the root of a cuspid tooth of a man, aged 37. The dentin, the cementum, the peridental membrane and the alveolar process are all plainly shown in this illustration. In the preparation of these specimens in the laboratory for the microscope, if we employ 5 per cent. nitric acid or 3 per cent. nitric acid for some time, the acid destroys the epithelial layer, including the granular layer of Tomes. In preparing sections the dentin is pulled entirely away from the cementum, which is held firmly to the alveolar process by the fibers of the peridental membrane.

The following facts further substantiate the fact that the external epithelial layer often extends partly or entirely around the dentin and inside the cementum. Epithelial cells that have lost their nuclei when granulation has taken place in the body of the cell—apparently dead cells—stain bluish purple or purple. This purple line is frequently seen extending from the crown on one side of the tooth between the dentin and cementum and around to the crown on the other side.

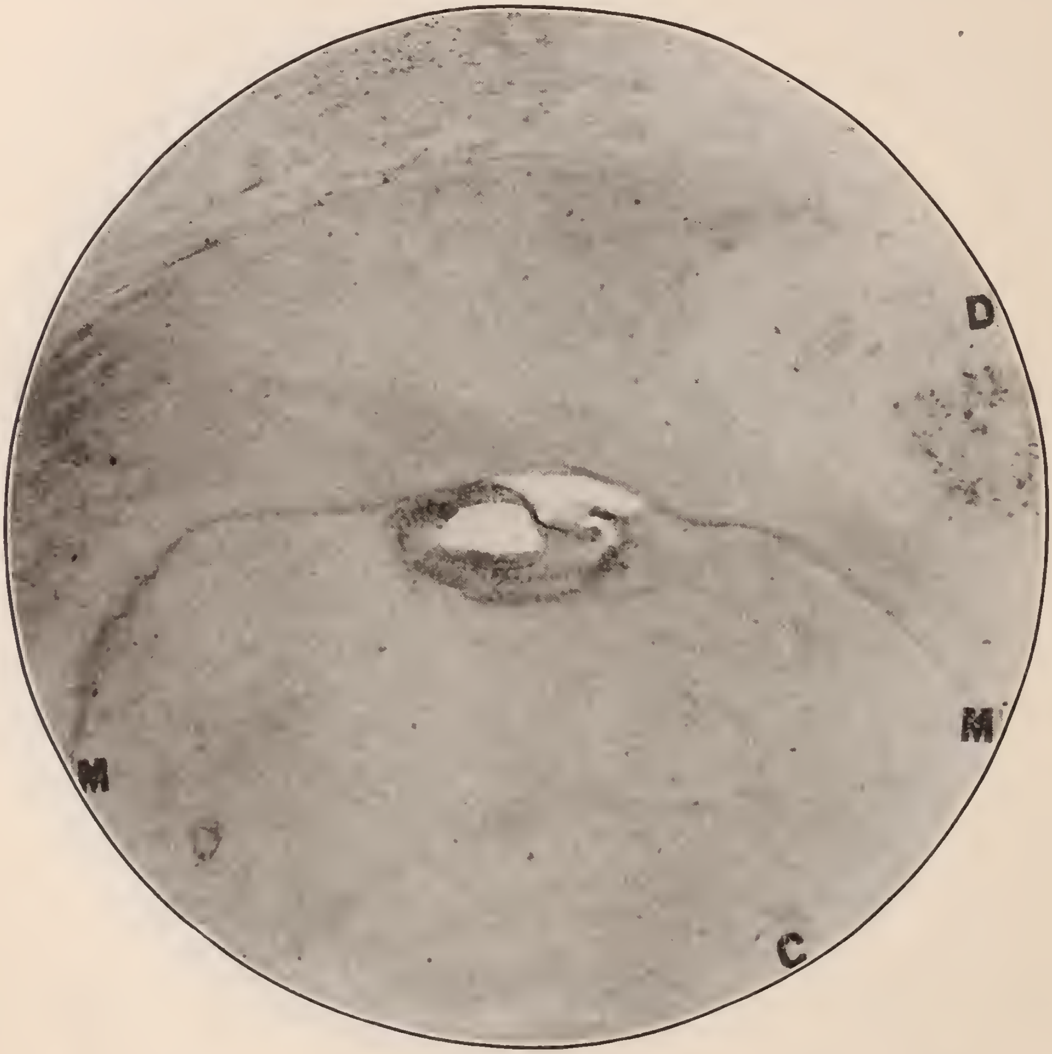

Fig. 13.—Higher magnification of human inferior second molar: C, cementum; D, dentin; M, external epithelial layer, located in the granular layer; × 75.

For further proof that the external layer can and does extend entirely around the dentin of the roots of the teeth, the following illustrations are presented.

Fig. 12 shows the lower part of the crown and roots of a human molar tooth. The crown had been imperfectly filled with gutta percha, which did not reach the roots of the tooth. Layer after layer of cementum is seen between the roots. At the center and midway between the dentin and the cementum a bright spot is observed. Following this bright spot in either direction, a dark line may be traced moving between the dentin and the cementum down the entire length of the roots. The dark line is the epithelial layer extending around the dentin from the crown of the tooth. A loop of the external epithelium occurred at the bright spot, leaving a space, the granular layer of Tomes.

A higher magnification, *Fig. 13,* gives a better detail of the cavity

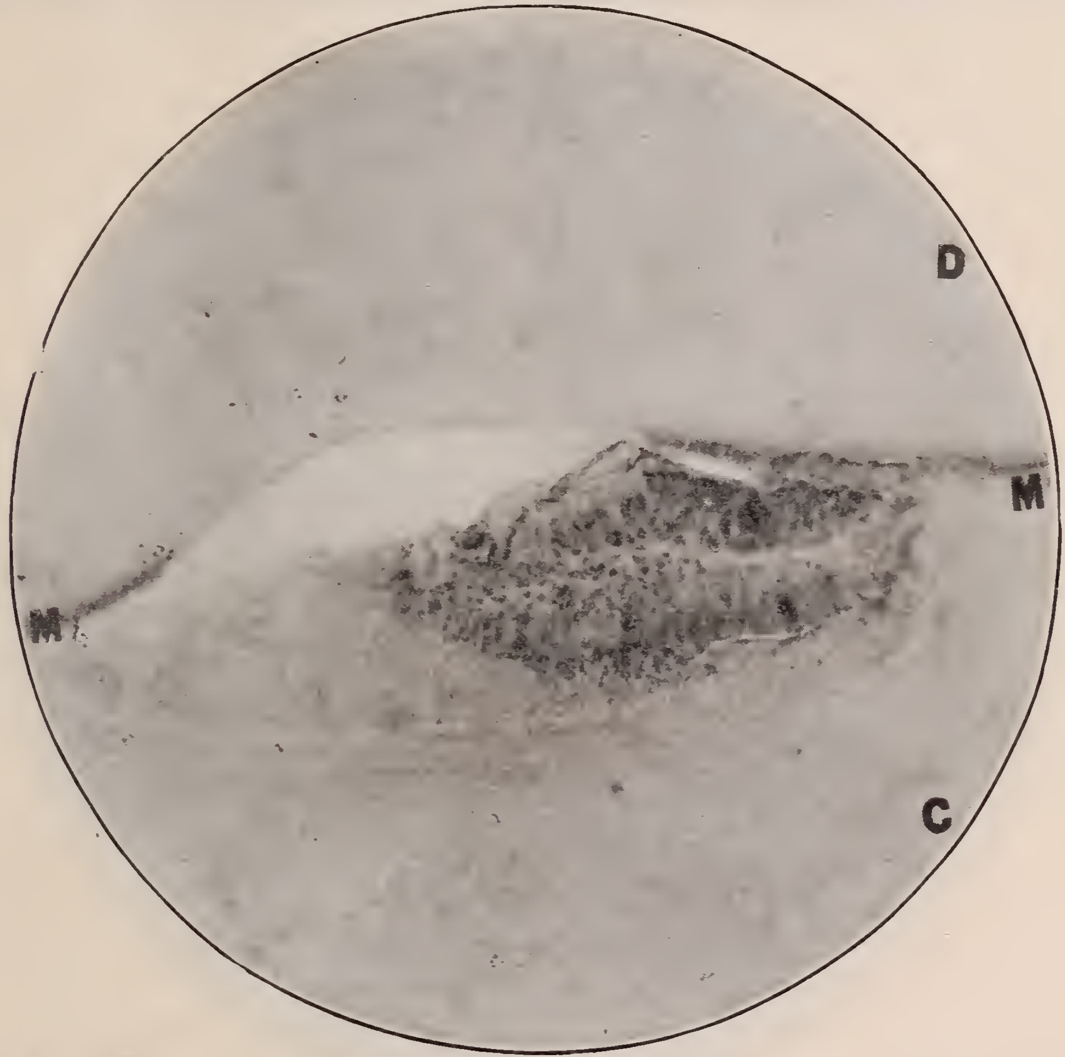

Fig. 14.—Still higher magnification of cavity containing a nest of epithelial cells; C, cementum; B, dentin; M, external epithelial layer in the granular layer of Tomes; × 275.

and the dividing line between the cementum and the dentin. The epithelial cells are well shown. A still higher magnification, *Fig. 14,* shows the cells in a glandular formation. The question now is, how could epithelial cells migrate to the inner surface of dense tooth structure and be well nourished in any other way than that described? The external epithelial layer can be traced throughout the length of the root on either side up to the neck of the tooth.

As I have demonstrated that the external epithelial layer of the enamel organ may and does in many instances extend part way or entirely around the dentin of a molar or single-rooted tooth, and that it may survive the entire length of life, we are now prepared to take up the subject of Nasmyth's membrane.

NASMYTH'S MEMBRANE.

In some of the lower animals, especially the herbivora, the cementum alternates with the enamel and dentin to form the surface of the crown of teeth for the purpose of mastication.[3] The cementum for the crown of a tooth must be derived from the same source as that deposited on the root, since they are both contained in the sac or dental follicle. The sac of the tooth becomes the peridental membrane, and the peridental membrane produces the cementum.

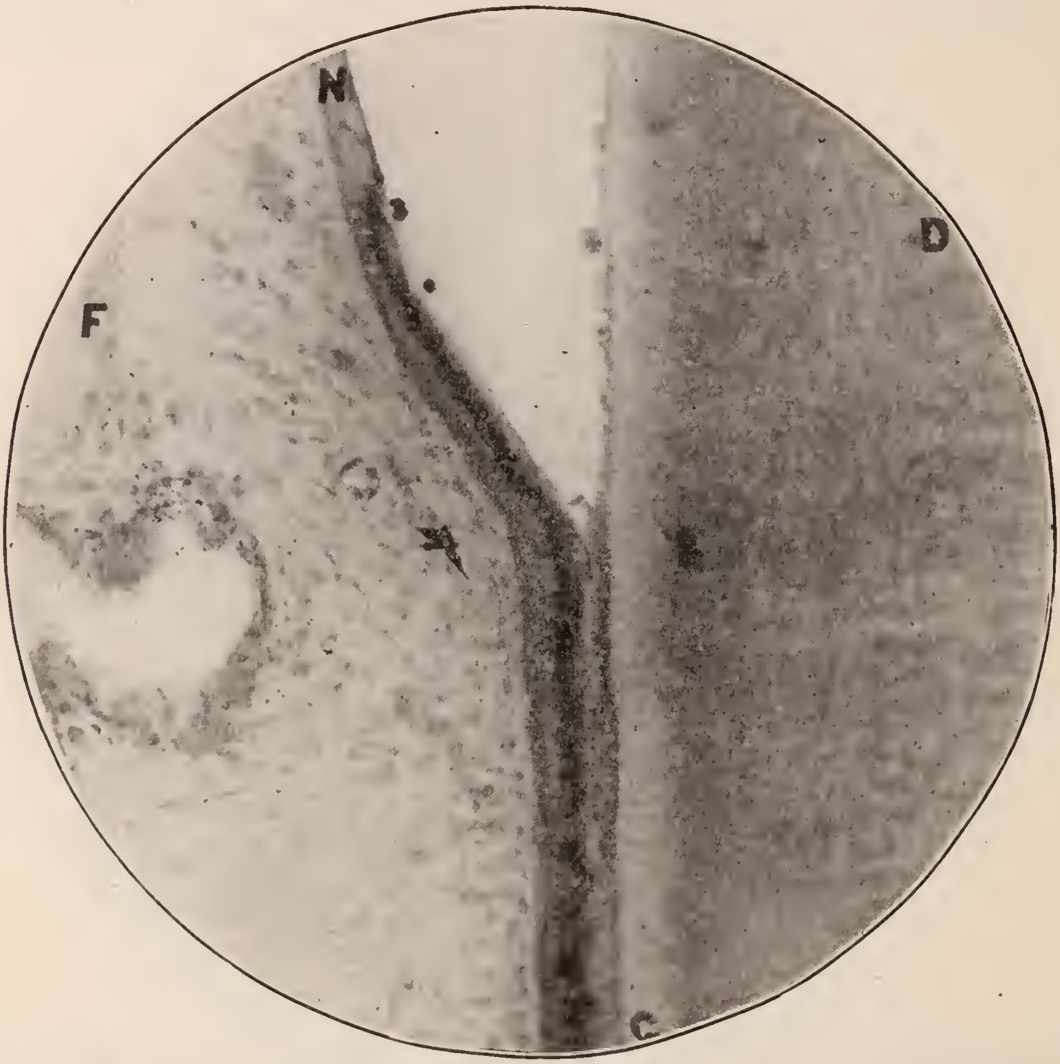

Fig. 15.—Permanent incisor tooth of a sheep; C, cementum; D, dentin; F, fibrous sac; N, Nasmyth's membrane; × 230.

We have seen that the fibrous sac and the external epithelial layer are in close contact throughout, and that the epithelial cells are nourished by the sac. As the tooth pushes its way through the bone by absorption, the epithelial layer and the sac wall follow the crown of the tooth. If the enamel is rough and pits are present owing to improper development, these tissues will cling to the enamel. On the other hand, if the enamel is quite smooth, these tissues will detach themselves and fold on the side of the alveolar process.

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[3] Owing to the length of this paper, details will be omitted.

Fig. 15 shows the neck of a tooth of a sheep. The epithelial layer and the fibrous sac, now the peridental membrane, are seen attached to the dentin of the root. They extend upward part way in the picture, and pass to the opposite side of the gingival space.

Fig. 16 is taken higher up, showing Nasmyth's membrane on the opposite side of the gingival space and extending up to the point of the tooth, which does not show in this illustration. The epithelial cells and the fibrous sac can be readily seen.

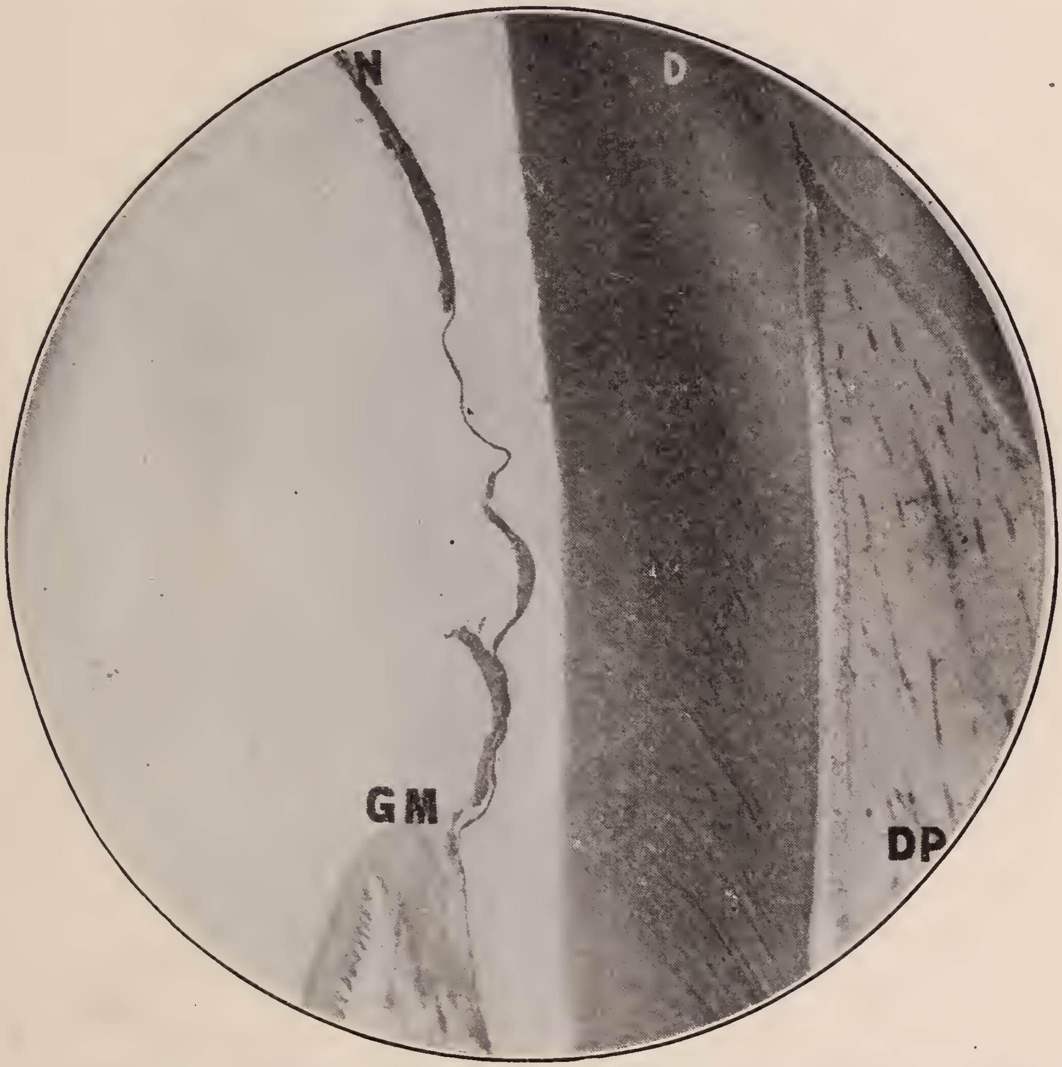

Fig. 16.—Same tooth higher above the gum margin: D, dentin; D P, dental pulp; G M, gum margin; N, Nasmyth's membrane; × 24.

Fig. 17 shows a higher magnification of the first section of Nasmyth's membrane just above the gingival space. The epithelial cells and the fibrous sac with the line of demarcation are beautifully shown.

The peculiar consistency of Nasmyth's membrane is due to the action of acids on partly-calcified epithelial cells in the preparation of the tissues for the microscope.

From an evolutionary point of view, the process of Nasmyth's membrane development in the human being is atavistic and is a survival from lower vertebrates.

Nasmyth's membrane also may be found in the pulp chamber. If we prepare the partly-calcified odontoblastic layer for the microscope in like manner we obtain like results.

EPITHELIAL DEBRIS.[4]

Under a low magnifying power I have already demonstrated epithelial cells in the fibrous sac. These cells migrate into the fibrous tissue of the sac after the enamel has become fully formed and the external epithelial layer has separated itself and become attached to the inner surface of the sac wall. Frequently part or all of the external epithelium does not come in contact, and the cells die. Cells that are nourished migrate in single cells or in any number from two to fifty or more. They arrange themselves in strings, in doubles, in loops and glandular forms.

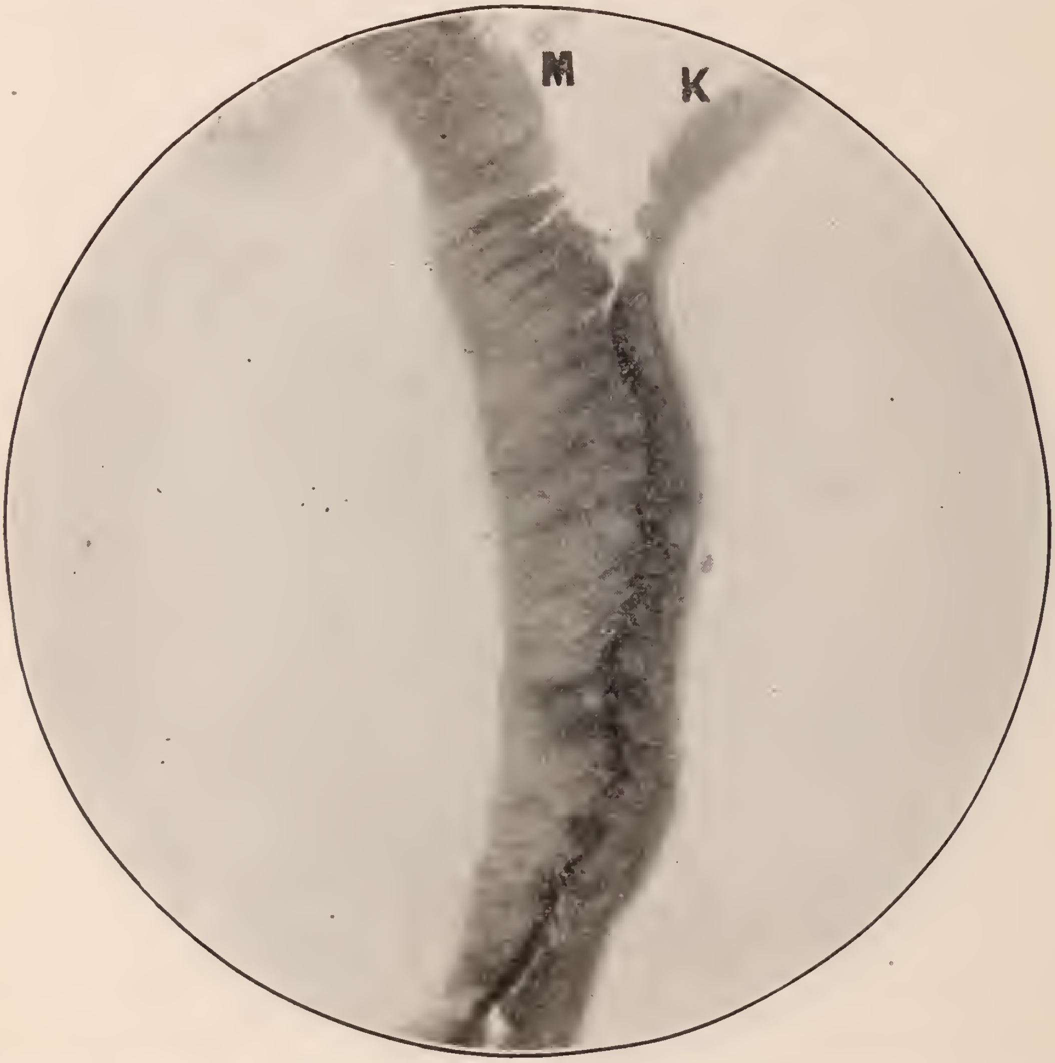

Fig. 17.—Higher amplification of a part of Nasmyth's membrane taken from Figure 16: K, fibrous sac; M, external epithelial cells; × 230.

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[4] The author first described epithelial cells in the peridental membrane and named them "epithelial débris" in his work on "Interstitial Gingivitis or Pyorrhea Alveolaris," in 1899.

Naturally a large number are found near and just below the neck of the tooth for the reason that the external epithelial layer is always found at that locality, while it does not always extend part or all the way around the dentin of the root. The following illustrations are taken at birth while the dental follicle is still intact and the tooth is just beginning to push its way to the surface. These pictures are all of a higher magnification, ranging from 150 to 300 diameters.

Fig. 18 is one of the most interesting of all. It is located at the upper border of the sac and in the direct line of the advancing tooth. It shows the cutting edge of a human incisor tooth with a space between it and the external epithelium. Dead cells are seen on the surface of the enamel. The external epithelial layer is seen at the edge of the illustration. At the right, but not visible in the picture, is a break in the epithelial layer, and the fibrous sac has penetrated inside the layer. The fibrous tissue is observed below and in the space.

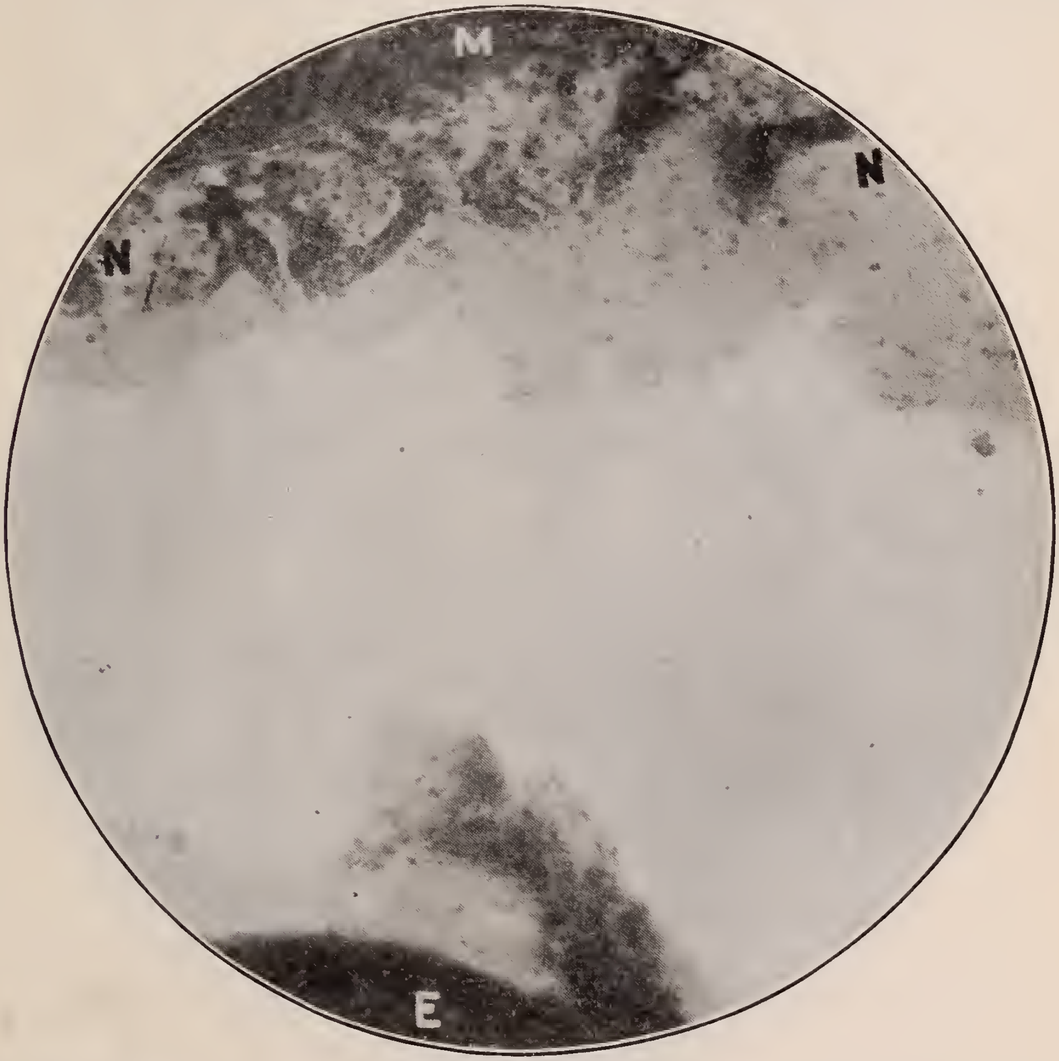

Fig. 18.—Taken from the upper border of Fig. 5: E, enamel at cutting edge of tooth; M, external epithelial layer; N, epithelial débris; × 155.

The epithelial cells or débris have migrated inside because of the fibrous tissue, instead of outside, as is usually the case.

Fig. 19 shows the epithelial layer disintegrating at the right of the illustration; quantities of epithelial cells have migrated from the layer into the fibrous wall of the sac in the center. This picture is taken at the left of the crown of an incisor tooth at birth.

Fig. 20 is taken at the right of a human incisor crown. Dead epithelial cells are seen on the enamel. The external epithelium is disintegrating. The live and dead cells are readily seen. Epithelial cells are seen at the left migrating into the fibrous structure.

Fig. 21 shows the end of the epithelial layer taken from *Fig. 5*. The layer is in close contact to the fibrous sac for the entire distance, except at the end. Cells are migrating into the fibrous sac at the right. At the end where the cells are not nourished, death is rapidly taking place.

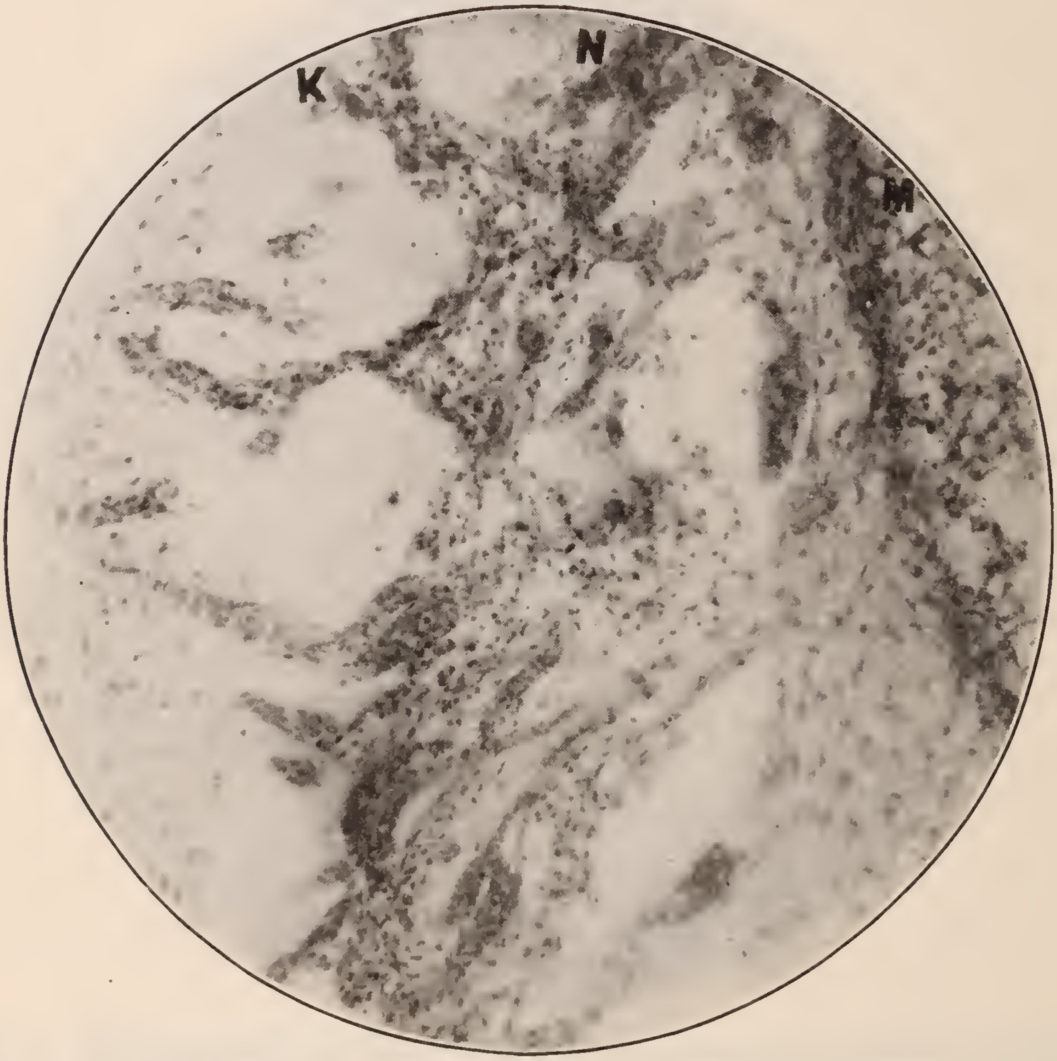

Fig. 19.—Taken from the left of the crown of Figure 6: K, fibrous sac; M, remains of the external epithelium; N, epithelial débris; × 155.

Fig. 22 is taken from a sheep and was shown in "Intersitial Gingivitis," published in 1899. It shows the cells in rows, in glandular groups, and in different shapes. The most interesting thing of all in this picture is the group of epithelial cells caught and embedded in the cementum. The wonder is that they are not more numerous.

Up to this period, that is, while the external epithelial layer is disintegrating, the dental sac is isolated from the surrounding tissues by a space. The fibrous tissue of the alveolar process now begins to develop toward the sac, and the space is closed, thus uniting the sac with the fibrous tissue of the alveolar process. Bone formation now rapidly takes place, filling the fibrous tissue and encroaching on the fibrous sac. After the fibrous tissue of the alveolar process has united with the sac wall, the vascular supply has become established between the alveolar process and the sac, which has now become the peridental membrane, and for the first time cement begins to deposit on the dentin or on the external epithelial layer if it extends below the neck of the tooth.

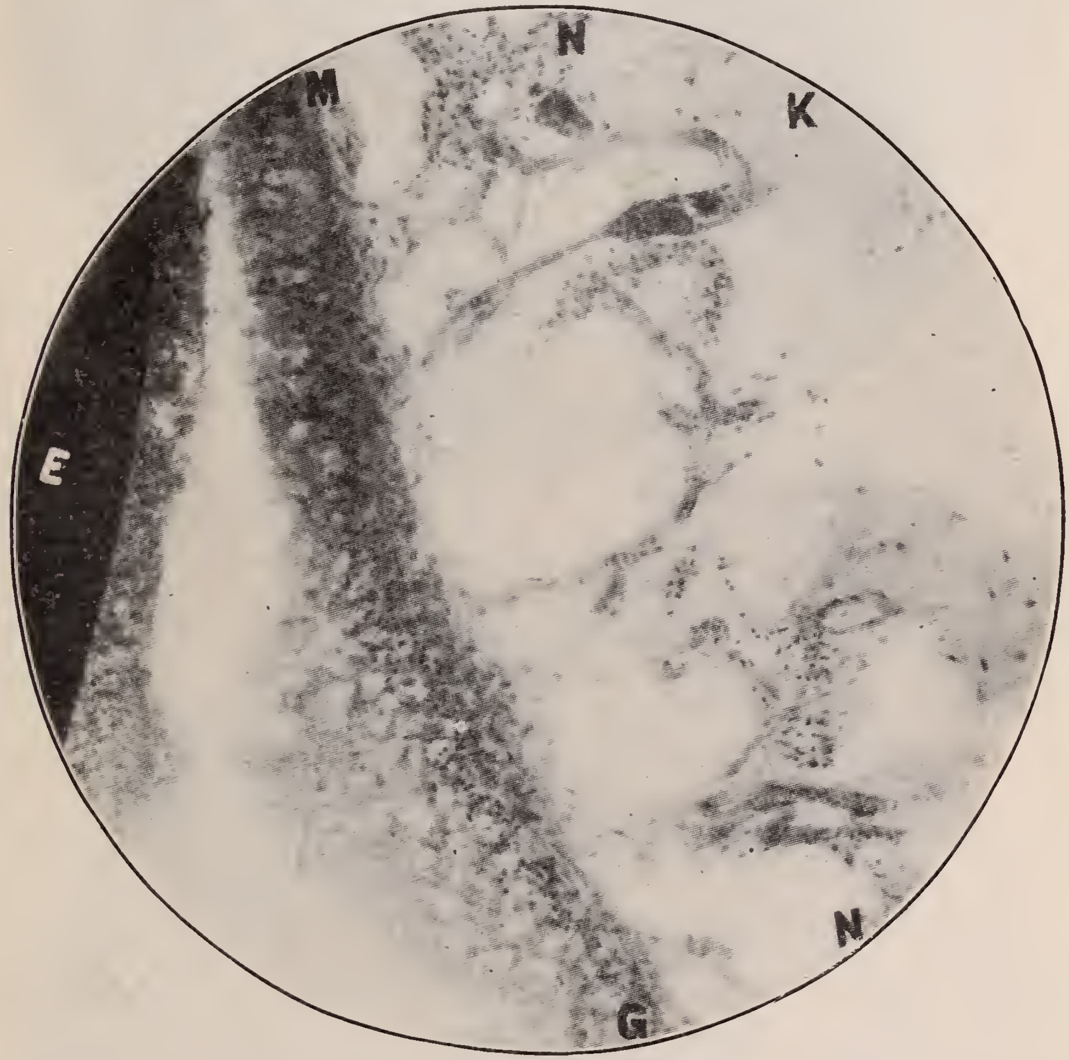

Fig. 20.—Taken from the right side of the crown of Figure 6 at the edge of the enamel: E, enamel; M, granular layer of epithelial cells migrating from the external epithelium into space; N, epithelial débris migrating into tissue of fibrous sac; K, fibrous sac; × 155.

In the study of embryology and histology of the jaws and teeth, my experience has been that one can obtain better results by taking the material of both animals and man at birth rather than embryos in their early development. The reason for this is that in all other tissues of the body, embryology and histology must be studied from the beginning of

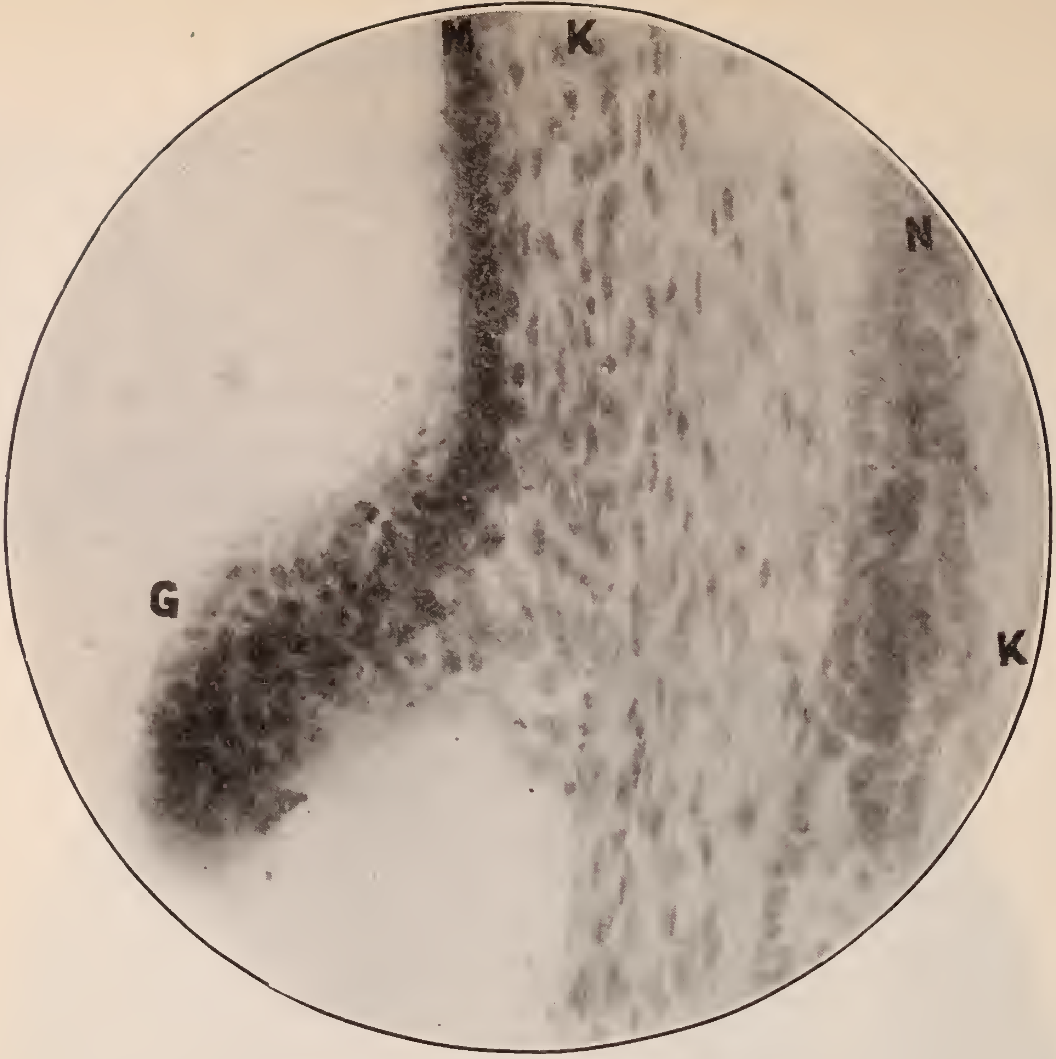

Fig. 21.—Higher magnification of the end of the external epithelial layer at N. in Fig. 5: G, granular or dead cells at the end of the disintegrating external epithelial layer; K, fibrous sac; M, epithelial layer; N, epithelial débris; × 400.

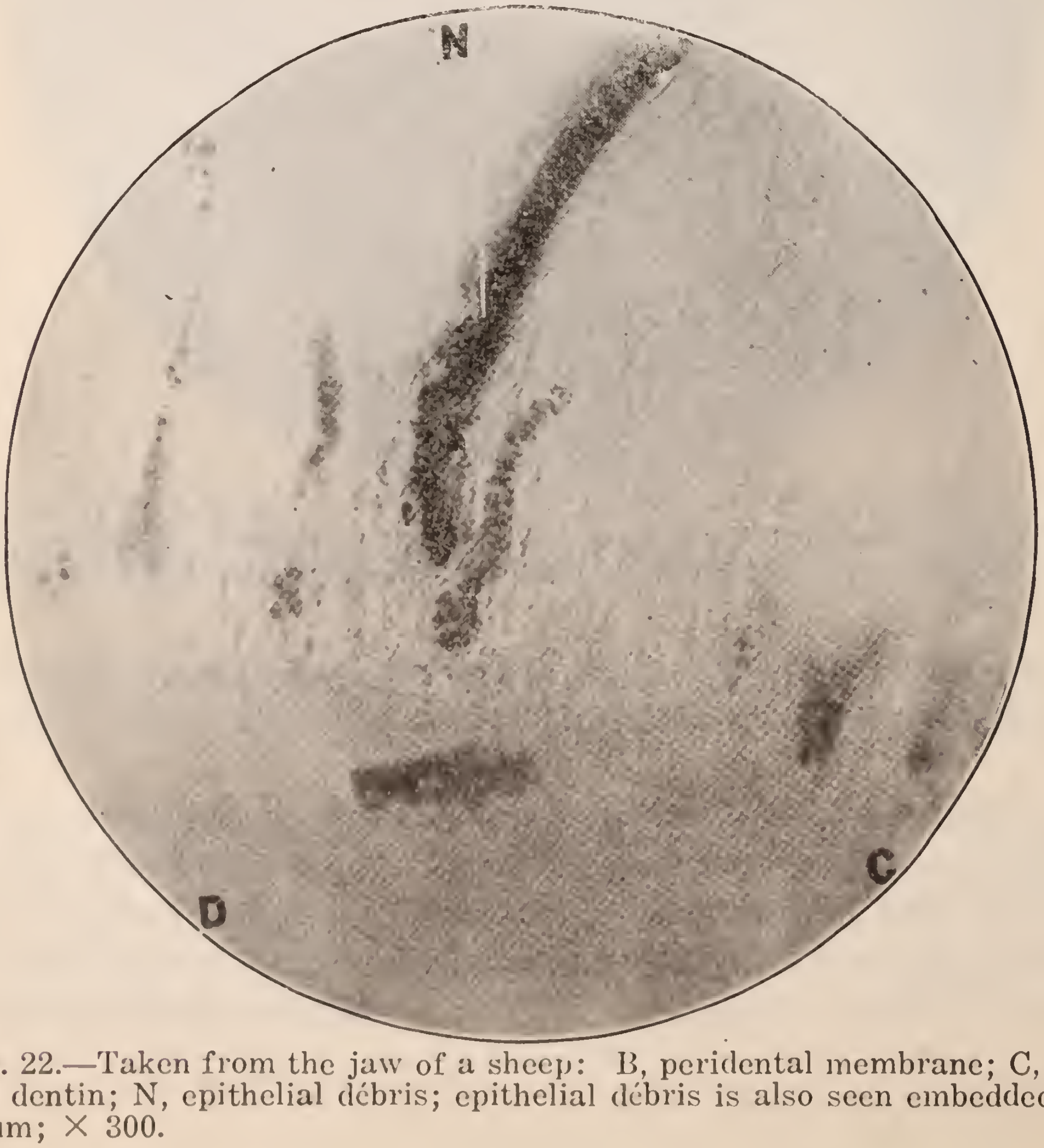

Fig. 22.—Taken from the jaw of a sheep: B, peridental membrane; C, cementum; D, dentin; N, epithelial débris; epithelial débris is also seen embedded in the cementum; × 300.

evolution, because the tissues go through the process of development but once. On the other hand, the dental tissues develop twice, and by taking the jaws at birth we have all of both sets of teeth still in the jaws under different stages of evolution. The jaws and tissues are more stable in their growth, the tissues are more easily recognized, and the relation of one structure to another is better outlined.

DISCUSSION

Dr. Frederick B. Noyes, Chicago: Dr. Talbot is mistaken in his interpretation of the material. The enamel is formed from the internal and not from the external layer. The external layer disappears and the internal remains. Nasmyth's membrane is a myth. The condition which Dr. Talbot found in many of these specimens is characteristic of all material prepared by the decalcified process. For some unknown reason, the cementum separates from the dentin in the process of decalcification, especially if the acid used is too concentrated. It is often exceedingly difficult to decalcify, especially if the blocks are large and we are trying to retain the entire tooth without separation of the cementum at the line of the dentin; but I do not believe that this difficulty arises because there is a line of epithelial cells. There is no evidence to support that view. The one thing I want to emphasize is the way the blood vessels follow the dental papilla. The blood vessels enter the dental papilla through its base. That is one of the items which must be considered in the investigations in regard to the retention of pulpless teeth.

Dr. Martin Dewey, Chicago: Some of the conclusions Dr. Talbot arrived at are based on misinterpretations of the specimens. What he called dentin was only the dentin papilla. The dentin had not yet formed on those specimens, He called attention to the tooth of a dog which he showed as a perfectly calcified tooth and did not mention the gingival ridge which is so well developed in the dog's tooth. The root had not begun to calcify in that tooth.

Dr. Eugene S. Talbot, Chicago: I am aware of the fact that the substance of this paper is new and original, and that the text is entirely opposed to the views laid down in our textbooks. While it is possible, and perhaps true that these types are not to be found in every tooth in our present state of evolution, yet I have found these conditions in the teeth of many persons of advanced age as well as in the lower vertebrates. I believe that these conditions are atavisms, of lower vertebrate types, but I have not had sufficient experience with microscopic structures of the lower vertebrates to express a definite opinion. They seem, however, to be degeneracies. The opposite views expressed offhand by those who discussed the paper can have little or no weight since the same amount of research with the same materials must be done before an intelligent opinion can be expressed. I would hardly dare to present such radical views in regard to the freakish actions of the epithelial cells if I were not supported by such men as Drs. Ludvig Hektoen, E. R. LeCount and Adelbert M. Moody, of Chicago, who devoted considerable time to studying the microscopic slides of the epithelial structures.

PRACTICAL SUGGESTIONS IN FULL DENTAL RETENTION, FOLLOWING HALL'S AND GREENE-SUPPLEE METHODS.*

BY M. E. NISWONGER, D.D.S., DAYTON, OHIO.

THE PURPOSE of the paper is not to teach you anything new, but to impress upon your minds more clearly the methods of our leading prosthetic men, and in a simple and effective manner the method of taking impressions with mouth closed and under normal biting stress.

Quoting from Dr. Hall: "The success of an artificial denture can be no better than its supporting foundation—the jaw. Hence the accuracy with which we study and utilize the foundation will determine the success or failure of the denture."

Equal study and care, however, must be given the form and arrangement of the teeth, as the retention of the substitute may be impaired and the denture condemned as ill-fitting and unsatisfactory, when the real trouble lies in faulty form and arrangement of the teeth. Thus we find that the successful retention of artificial dentures is not wholly dependent upon good impressions and casts, but upon the form and arrangement of the teeth as well.

Granting that we have made the mechanical design accurately, we come to the physical forces retaining the denture, because the physical is the resultant of the mechanical relations created between the denture, tissues and teeth.

Since you are all familiar with the physical forces, which are adhesion, cohesion and atmospheric pressure, we will not discuss them here.

Retaining an artificial denture against displacement and partial or complete dislodgment, is to utilize the physical forces to the highest degree possible, covering the entire surface of the jaw with the base: adding to the base a periphery, extending upon and adapted to the flexible peripheral tissues, sealing the peripheral border against the ingress of air. To obtain these results in the upper denture is by the proper use and manipulation of modeling compound, equalizing the bearing on the soft and hard tissues alike, while they are in their working position; thereby giving the patient the greatest amount of comfort. Hence this equalization must be done with the mouth closed and under the normal biting stress; the finished impression must be the exact model of the proposed denture, as far as the height of the rim, thickness of the peripheral and length of the plate anteriorly-posteriorly, are concerned.

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*Presented before the Columbus Dental Society April, 1918.

However, in taking the lower we reverse the principle from the upper. This is done with the mouth open, muscles in maximum normal distention. Constructing on individual tray with modeling compound over which plaster of Paris, mixed to the correct consistency,. is flowed. and again inserted into the mouth.

The tendency in taking the lower impression with modeling compound alone is to distend the muscles beyond normal movement. (Since writing this paper, Dr. Russel Tench, N. Y. City, has originated a procedure whereby the stretching of the muscle by compound is eliminated. He uses no plaster.) Plaster of Paris is far more pliable and adaptable for lowers than any other material, and by aid of a correctly-formed, individual tray it may be handled with such control that any desired form of impression may be secured. Hence, by finishing with plaster of Paris we can detect any faulty manipulation of modeling compound.

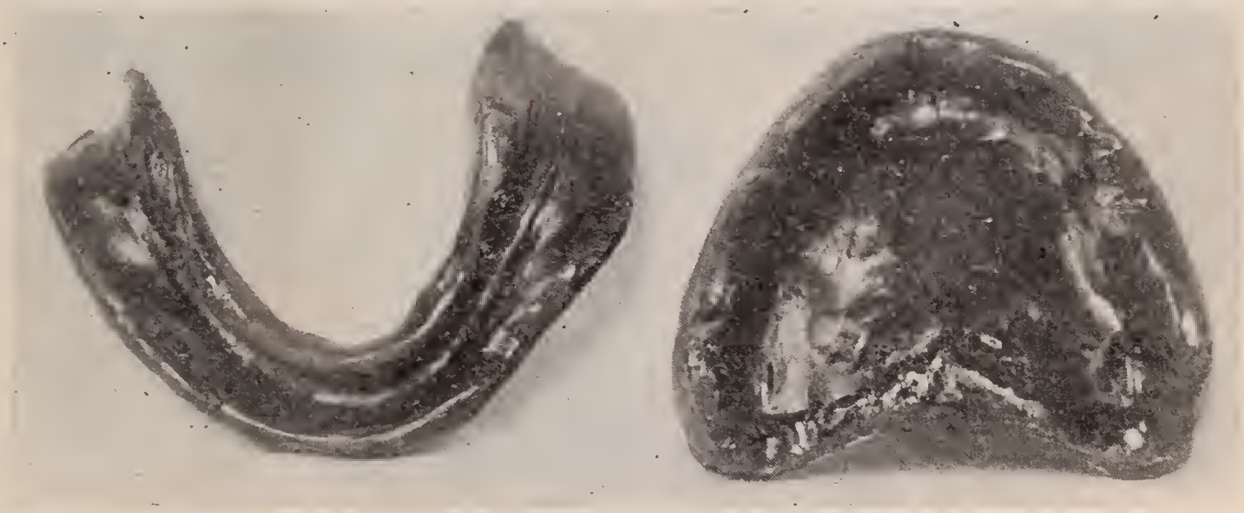

Fig. 1.—Showing finished upper compound impression, and finished lower compound ready for the thin mix of plaster of Paris.

Before taking an upper impression we first examine the mouth, both open and closed, by passing the index fingers along the buccal and labial region of the ridge, also along the posterior portion of the vault to get an idea of heights of rim and the length of the proposed denture, anteriorly-posteriorly.

We should also note particularly the hard and soft area in the hard palate and location of the anterior palatine and posterior palatine foramen. Through these foramina the blood and nerve supply for the hard and soft palate courses.

In examination of the lower we should note where the mylohyoid ridge runs, as the finished denture should not extend below it. Note also muscle attachment labially and buccally.

We next select a suitable upper impression tray (the writer prefers Kerr's trays on account of easy adaptation), one that fits the vault approximately anterio-posteriorly, and labial and buccal borders of the ridge; always allowing about one-eighth inch on each side to accommodate the compound. If necessary trim tray with curved scissors, one-eighth inch short of all muscular attachments to allow for muscle trim.

In fitting lower tray, trim the edge of the tray and adapt same one-eighth inch short of normal muscle-action when called into play when mouth is open. This is done buccally and labially. Lingually trim one-eighth inch short of mylohyoid ridge.

PREPARATION OF THE MODELING COMPOUND.

Here is where many operators fall down in their technic. Compound, if handled in the right way, can be made extremely soft without boiling, and an even temperature may be maintained indefinitely by use of an electric heater which allows three grades of heat—low, medium and high. Modeling compound never should be boiled but worked at a temperature of 155° to 160° F.

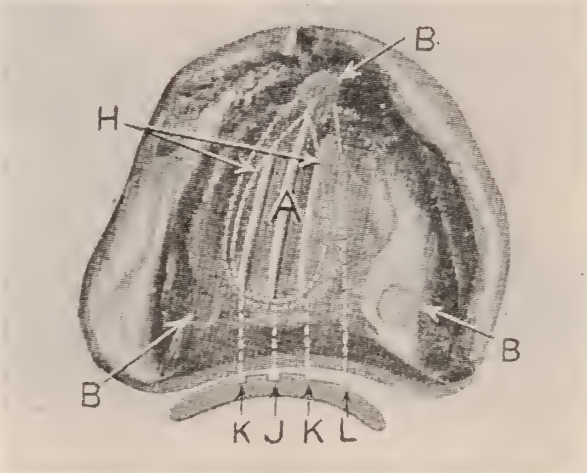

Fig. 2.—A, hard area; K, J, K, J, depth to scrape in impression; B, at these areas are the openings of anterior and posterior palatine foramen. Scrape compound there. (Dr. Russel Tench.)

We next take from our heating-pan enough compound for the upper impression. Amount will be determined by experience. With moistened fingers form it into a ball, placing it on the tray, shaping the soft compound into a mold in the center of the tray, with a depression all along where the alveolar ridge will come and with a relatively-high ridge to go up under the lip and cheek.

We now quickly pass impression surface of the compound over a Bunsen flame so that the surface may be rendered softer than the underlying portion, and after dipping the entire impression into hot water, which will prevent sticking to the mucous membrane and burning the patient, we are ready to take our first impression.

TECHNIC OF TAKING IMPRESSION.

Fig. 1. The purpose of the first impression is to fit the compound to the roof of the mouth only, and to get the height of the rim.

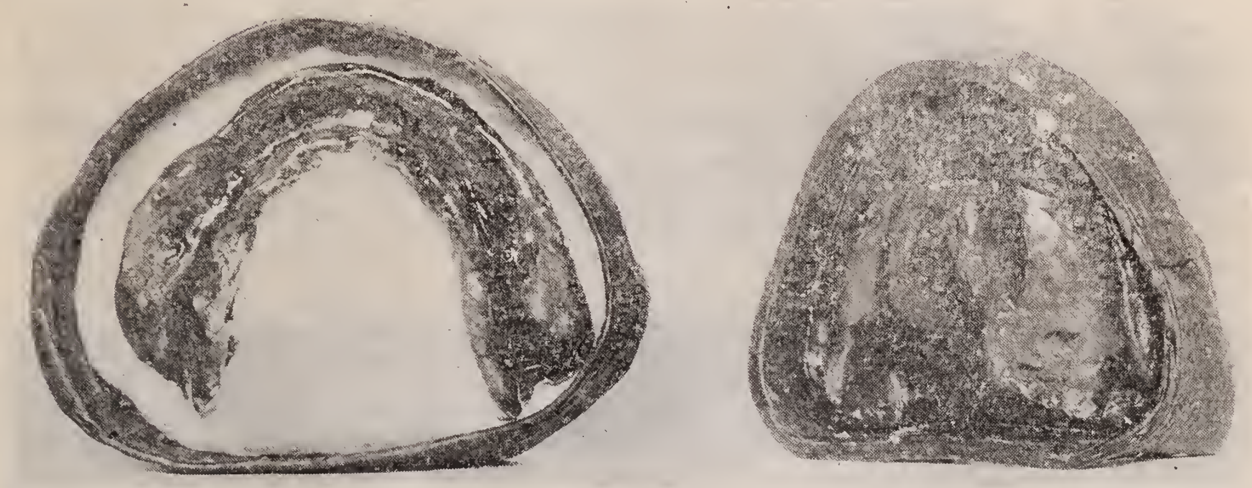

Fig. 3.—After using a thin mix of plaster on lower compound tray, a thin coat of shellac and sandarac is applied; then embedded in plaster of Paris and a wax rim placed around as illustrated with a cut on left. This is now ready for Spence's or Weinstein's material. Cut on right is upper impression boxed up ready for Spence's or Weinstein's. Note how to preserve periphery of impression.

After the tray is passed into the mouth we press it home with side-to-side motion, centered and with the left index finger. Holding the tray home we press the compound on the buccal and labial surfaces upward and against the ridge by the right index finger.

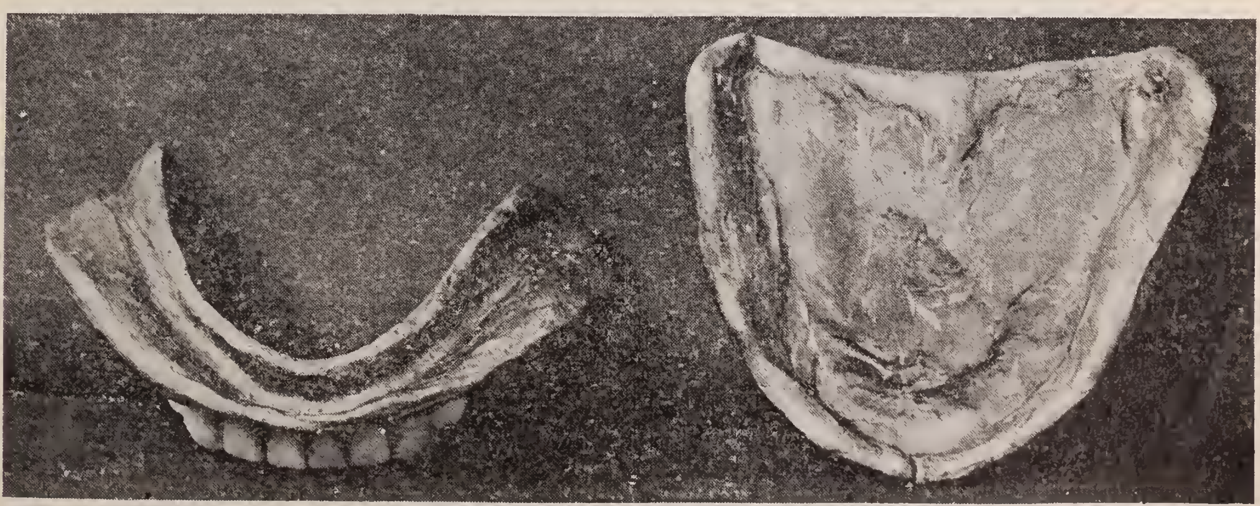

Fig. 4.—Inside surface of finished dentures. Note the absence of relief chamber in upper.

Hold the impression into place until the compound has become hard enough to be removed without distortion. The use of cotton rolls dipped in cold water will hasten the cooling in the mouth.

Now have the patient inflate the mouth with air. This action will loosen the impression causing it to come down. If the impression is not removed by this method, but by the operator, the margins will be distorted.

As the impression comes from the mouth the buccal and labial margins are thick enough to distend the tissues of the cheek and lips. This condition can be remedied by trimming the margins with sharp knife to thickness desired in finished denture to give patient desired expression. Care should be taken not to alter the form of margins or to break compound.

Now build upon under surface of tray a roll of compound corresponding to occlusal plane of teeth in proposed denture.

We cannot proceed to muscle-trim until we have taken the lower impression.

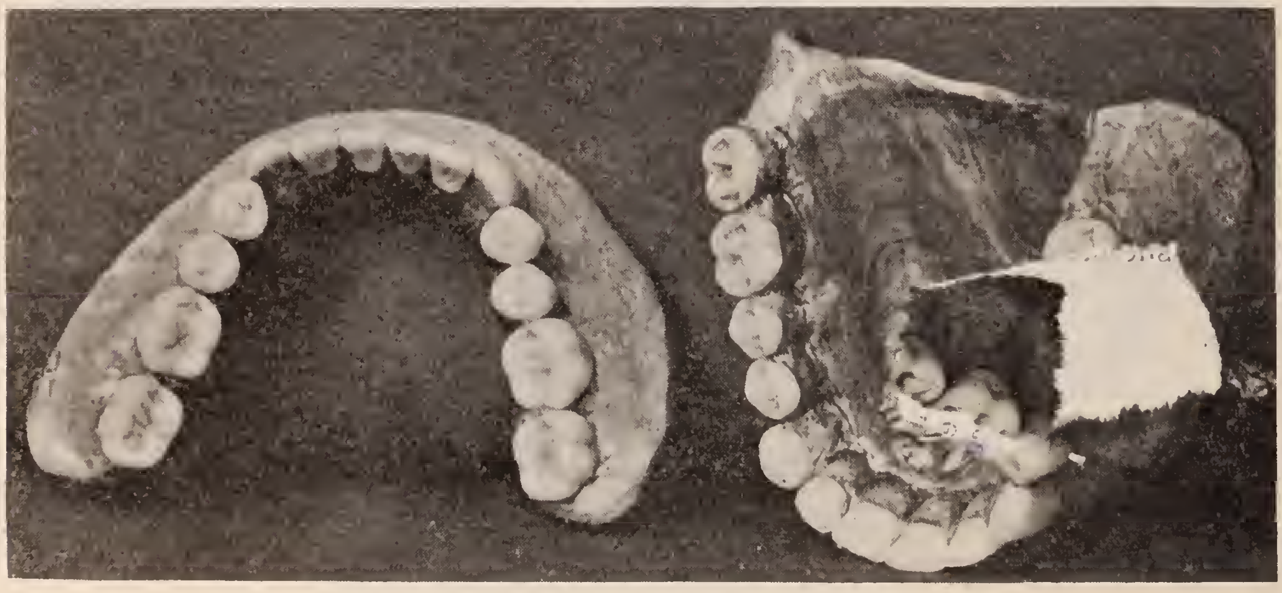

Fig. 5.—Note the natural effect produced by carving of lingual surface of upper and insertion of rugae.

LOWER IMPRESSION.

In taking the lower impression the manipulation of the compound is the same as in the upper. But when the tray is pressed home, have patient move the tongue side-to-side and touch the upper lip. These movements will call into play the lingual muscles which will trim the compound as desired in proposed denture.

Upon the upper surface of tray build a roll of compound corresponding to the occlusal plane of lower teeth, and with this roll soft, and upper impression in place, we have patient close as in taking the bite.

MUSCLE-TRIMMING UPPER IMPRESSION.

The finishing step in this procedure is accomplished by modifying the margins of the impression to conform to certain portions of the soft tissue under normal biting strain.

With the lower impression in place, we warm beside a small flame the entire buccal and labial margins of the upper impression until compound is soft enough to permit adaptation by massage, but not soft enough to change its form. The impression should be inserted quickly in mouth, the patient asked to make laughing and whistling movements, and the compound massaged to a better adaptation to the buccal and labial tissue. Repeat this operation if necessary, which will be determined by experience.

It is also very important that the upper impression should be adapted to the soft tissues, which overlie the posterior part of hard palate on either side of the median line when these tissues are relaxed.

Impressions taken with the mouth open reproduce these tissues in distended positions. When the mouth is closed they occupy very different positions, and a denture made over a model representing the distended positions may fit them so poorly as to cause nausea. If the denture fits these tissues in their relaxed position it will be stable at all times and will not cause nausea, no matter how long denture may be.

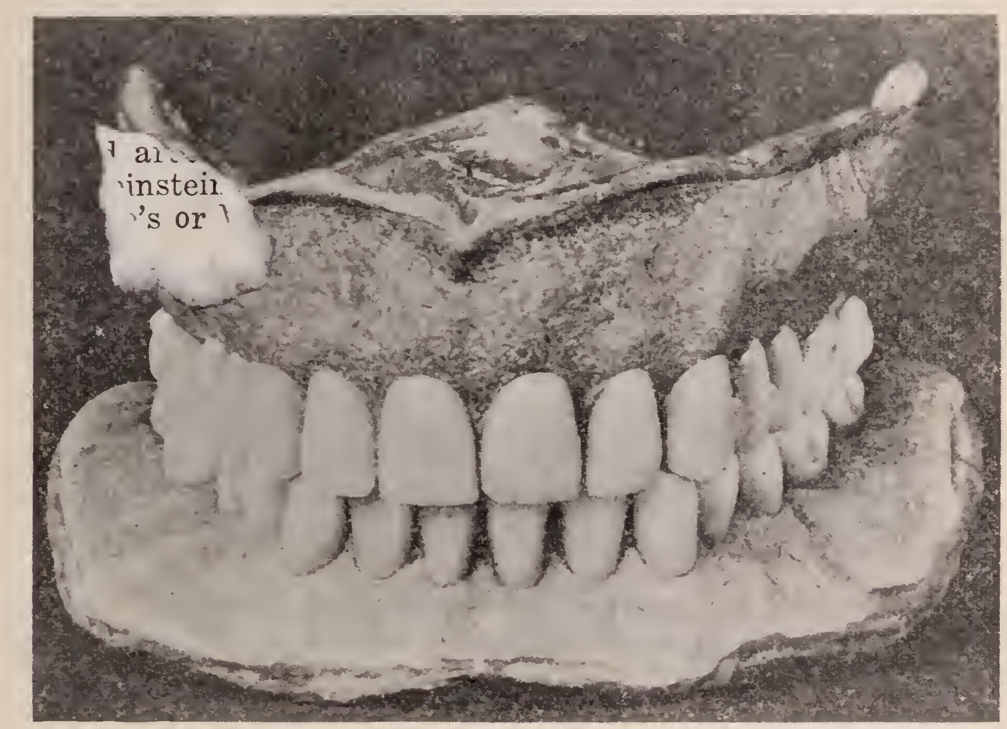

Fig. 6.—Esthetic should be given utmost consideration. Note the absence of unsightly bulging molars and bicuspids and the natural relation of cuspids.

In adapting the impression to the relaxed position add compound or card wax over the area which they occupy, and while soft, insert into mouth and have patient close, bringing tightly together upper and lower bite blocks, instructing him to swallow two or three times.

The tongue is automatically carried to the roof of the mouth during swallowing, and the action drives the soft material into firm contact with the tissues overlying the posterior portion of the hard palate, and holds it there until it cools. Now remove impression.

Outline the hard area and posterior foramen in patient's mouth with indelible pencil. This outline will make a print on the impression when we again insert it. Now scrape the impression, as outlined by indelible pencil on the hard area, until the impression cannot be dislodged by a rocking motion. (*Fig. 2.*) Relieve the pressure at the opening of the anterior and posterior palatine foramina. This will later prevent atrophy of the tissues and will keep the upper jaw in a healthy condition.

FINAL STEP OF LOWER.

Fig. 3. Using only the best French's plaster, sifting it into plaster bowl containing warm water, to which is added sodium chlorid or potassium sulphate, until the plaster is of a creamy consistency. Flow this plaster over the modeling compound tray and insert into the mouth. As the tray is pressed home with a side-to-side motion, instruct the patient to raise tongue, then down to normal position when at rest.

This action will permit the plaster to flow under the tongue, corresponding to the proposed denture. Repeat this operation if necessary until we have an accurate impression.

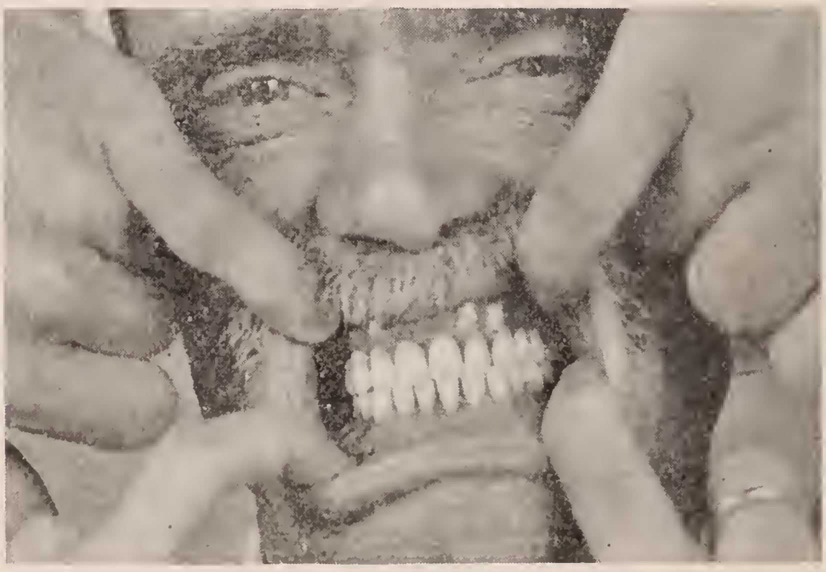

Fig. 7.—Effect of Fig. 6 can better be illustrated in mouth. The camera was placed to patient's left so as to show greater amount of bicuspid buccal surface, and yet they appear pleasing.

LAST BUT NOT LEAST.

Pour casts with nothing but Spence's or Weinstein's material, always keeping in mind when trimming the casts that the peripheral of proposed denture is to be the same as the peripheral of impression. In taking the bite, construct base plate over cast and build up rim upon base plate corresponding to occlusal plane of teeth with modeling compound.

To discuss the kind of articulator best to use, articulation and esthetics, would make this paper too lengthy. However, do not use a plain line, but one that employs the habitual jaw movements.

In conclusion I might state that we have men who condemn compound work and call men who do use it "hobbyists," and their methods nothing but erroneous and empirical. However, the results are what we want, no matter how they are obtained, and the old axiom, "The proof of the pudding is in the eating," will be demonstrated in my clinic following this paper. I thank you.

1105 U. B. Building.

A RECONSIDERATION OF THE WORK ON FOCAL INFECTIONS, WITH ESPECIAL CONSIDERATION OF THE ORAL PHASES.*

BY R. C. COOLEY, D.D.S., HOUSTON, TEXAS.

REALIZING to the fullest degree the amount of research which has been done along these all-important lines, and the articles without number which have appeared in our journals and in book form on this subject, I find my apology for presenting this paper to you at this time, in the fact that there are all too many of the studious members of our profession who, while accepting dental focal infections as an established fact, have at the same time become so perplexed and mystified by the abundance of this literature which has come to their hands, that they have almost become fearful of removing pulps, filling root canals, treating alveolar abscesses and even thorough cleansing and scaling of the teeth. To these men is this paper addressed, and if I am successful in clearing up any points at issue in their minds, I will indeed feel that my time has been most profitably spent.

We are indebted to such men as Roseneau, Billings, Gilmer, Hartzell, Flexner, Moody and Hatton for the isolation and experimentation upon the bacteria involved in all forms of oral septic lesions; and a careful study and comparison of the works of these men will give each and every one of us a working knowledge of the pathological considerations involved in whatever case may present. Time and space will not allow me to go into the laboratory findings and experiments of these men, therefore I can do no better than to recommend to all of you who have not already done so, that you procure and study these works at length.

The research into the disease organisms of pyorrhea alveolaris to us, as dentists, from a clinical standpoint, and the research into alveolar abscess, has seemed to center on the fact that the predominating organism is the streptococcus, and Billings says: "Streptococcus-pneumococcus group apparently comprise the important pathogenic bacteria related to systemic disease." This then narrows our studies down considerably.

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*Presented at Meeting of Texas State Dental Society at San Antonio, Texas, April 10, 1918.

It should primarily, of course, be our effort to prevent these conditions in all cases in which we are able to educate patients to keep themselves under our careful observation, since preventive rather than curative medicine is and should be the aim and the ideal of all of us. This can be possible only by strict personal care of the mouth by the patient himself and his dentist as well, in order that neither gingivitis nor pulp-involving caries may develop.

On the other hand, those cases which present to us with cavities already present which necessitate pulp extirpation, as well as those cases involving the first stages of pyorrhea, but neither of which has advanced to a point involving a focal infection, should put us on our mettle to the end that, in conducting our treatment and making such repair as may be expedient, we avoid the error of doing more harm than we do good. Right here I wish to make a plea for more thorough diagnosis of conditions of this kind which come under our care, in order that our curative procedures may be more intelligently arrived at and carried through. And, furthermore, I might add that I believe, upon a careful study of focal infections, none of us will refute the fact that no tooth at all is better than one with the pulp poorly extirpated, or with a peridental membrane hopelessly involved.

Thirdly, we have patients come to us, usually with some history of systemic sequelæ indicating focal septic poisoning; cases of advanced lesions about the tooth, which will often tax our diagnostic, and possibly our surgical ability, to the very utmost to locate, differentiate and remove. It is these cases with which this paper is chiefly concerned.

Because of the diverse relationships existent between medicine and dentistry, and dentistry and medicine, it is of paramount importance that the dentist be conversant with general medicine; also that the physician be intelligently informed of the lesions of the mouth bearing upon conditions involving the general health. It is necessary that the practitioner, whether he be physician or dentist, should understand the etiology and pathology as it pertains to the case in hand, to the end that both professions may work more in unity, more to a logical issue, and more towards the personal welfare of the case in hand. Only in this way can they practice therapeutics intelligently.

We are all of us having cases sent to us by physicians from time to time, who simply make the demand of us that we proceed with the extraction of any number of teeth—and this without paying us the courtesy of consultation in the matter, nor giving us any truly good reason for complying with their request. Such a demand could only be made by a man who had little respect for the dental organs in the human economy, little respect for the mentality of the dentist, or else he must be personally very poorly versed in the subject of differential diagnosis. Fortunately for our tempers, these ungrounded demands are made to us more infrequently than was the case a few years ago, and this is due, I believe and hope, to the dawn of an era of greater understanding between the physician and dentist.

Since the principal fields of focal infections are so numerous, it is always best to demand of the physician whether or not he had eliminated other fields than our own. If not, we may request of him that he do so, or else we may proceed to eliminate the mouth as a source of the trouble, in order that he may proceed in an endeavor to find the seat of infection in some other of the possible localities. These include:

1. The mouth.
    (a) Chronic alveolar abscess.
    (b) Suppurative pericementitis, or pyorrhea.
2. Tonsils.
3. Naso-pharynx.
    (a) Adenoids.
4. Sinuses.
    (a) Maxillary.
    (b) Frontal.
    (c) Ethmoid.
5. Middle ear.
    (a) Mastoid.
6. Genito-urinary tract.
    (a) Male prostate.
    (b) Seminal vesicles.
    (c) Pelvis or kidney.
    (d) Female uterus and Fallopian tubes.
7. Venous sinuses.
8. Intestinal tract.
    (a) Appendix.
9. Gall bladder.
10. Tubercular lesions.
11. Syphilitic lesions.

An examination of all these other organs and areas proving negative it would then devolve upon us to make a most thorough clinical, radiographic and microscopic examination of the tissues of the mouth, in an effort to locate the seat of the systemic disturbance there.

The clinical examination would consist mainly in obtaining from the patient such history as he may be able to furnish; a close observation of the general condition of the gums and peridental membrane. with a careful charting and study of the depth and size of any and all pus-containing pockets about the teeth, and finally the location and charting of devitalized teeth by means of thermal or faradic shock.

A complete X-ray of the mouth should then be made and carefully studied in the hope of locating rarefied areas indicative of a focus of infection, and, I might add, these radiographs, intelligently considered, are the most accurate form of diagnosing these lesions which we at present have at hand.

Finally, all teeth which may have rarefied areas about their root-ends should either be extracted or resected and curetted, as the extent of the lesion may warrant, and in either case it is wise and expedient to make a culture of the contents of the rarefied areas, both to determine the kind of infection, and also to preserve it for the making of an autogenous vaccine if this becomes necessary. Pyorrhea pockets should be surgically eliminated. or the tooth removed, as indicated—in either case making culture as above stated.

Thus may we work toward a logical elimination of all areas suspected of being responsible for the general systemic disturbance present in that individual case.

It might not be amiss here to report a case referred to me by a very able physician some two years ago, which was the most conclusive result attributable to a dental lesion that I ever have had, because his previous differential diagnosis and treatment was so exhaustive, and because the patient had but one tooth.

Mrs. M. B., Houston, Texas, presented April 25, 1916, referred by Dr. A. E. Greer. Patient gave history of having intermittent rheumatic pains in left shoulder and arm, extending over period of two years. When she presented, her physician informed me that he had eliminated all possible foci of infection outside of the mouth, and since she only had a lower left cuspid remaining, had left this consideration to the last. Despite the administration of all established anti-rheumatic remedial agents internally, the arthritis had continued until the left wrist and shoulder were practically immovable and the elbow entirely so. It had been necessary for him to make a plaster of Paris splint to brace and protect the arm.

The cuspid presented a mesial and distal pocket containing pus, but the tooth was vital, so no radiograph was made. A culture was made of the pus about the tooth, then the tooth extracted and a culture made of same in both agar and bouillon. Both these cultures raised colonies of the streptococcus viridans, together with some other cultures of no immediate importance to the case in hand.

After the extraction the patient was little, if any, improved, and at the end of a week, when a vaccine had been evolved, this was injected, following which the patient reacted strongly and had intense pain in the afflicted arm. At the end of six weeks, when about ten injections had been given, the patient had perfect movement of the joints of the arm, no pain, and it only remained for her to build up again the tone of the dormant muscles to have a perfectly useful extremity. No return of the symptoms has occurred.

I have mentioned this case simply because of its eliminative conclusiveness, and to impress upon all the great importance of a thorough diagnosis, treatment and after-treatment of all such mouth lesions.

In conclusion I wish to impress the fact that we, as members of the dental profession, are entrusted with the preservation and repair, rather than with the removal of teeth, and we should not allow ourselves to be coerced into the promiscuous elimination of sound organs of mastication because of pressure brought to bear upon us by an ill-informed patient or an ill-informed physician, but should be governed solely by the individual symptoms and our personal diagnosis in the individual case.

Needless to say, a more perfect understanding and co-operation between the dental and medical professions is necessary, before logical and intelligent results can be obtained in these cases which involve us both, and it is to this end that I make a plea that we all may work, first by educating ourselves more thoroughly in our specialty, and secondly, by educating the medical profession to the acknowledgment of our professional standing and our professional rights.

Refitting or Adapting An Ill-Fitting Vulcanite Denture

When the maxillary denture seems to be everything that it could be but lacks perfect adaptation along the posterior border, thus allowing the ingress of air with the refusal of the case staying in place, this can be easily overcome by the following technic: Dry the denture and trace some of Kerr's green stick compound along the posterior border. Place it in the mouth while the compound is soft, thus allowing the tissues to press it to place and seal this border. Make a cast of the posterior half of the denture, separate the two, then warm carefully the vulcanite over a small gas flame until it is pliable, place it on this cast and burnish it to place, holding it there until it is cool. If the technic was carefully looked after, the operation will be a success.—*F. W. Frahm, Pacific Dental Gazette.*

FRACTURES AND DISLOCATIONS OF THE JAWS*

BY CHALMERS J. LYONS, D.D.SC., ANN ARBOR, MICH.

PROFESSOR OF DENTAL SURGERY, UNIVERSITY OF MICHIGAN

GUNSHOT FRACTURES (CONTINUED).

THIS WORK on fractures and dislocations of the jaws would not be complete without having incorporated in it something of the brilliant achievements of our brave confreres in France. The author is under great obligations to that pioneer in war dental surgery, Dr. George B. Hayes, of Neuilly (Paris), France, who has kindly given him permission to review some of his very interesting cases and to use some of his illustrations.

The following is a brief review of some of the cases treated in the Dental Section of the American Ambulance at Neuilly, France. These are published in full in the *Dental Cosmos,* 1916.

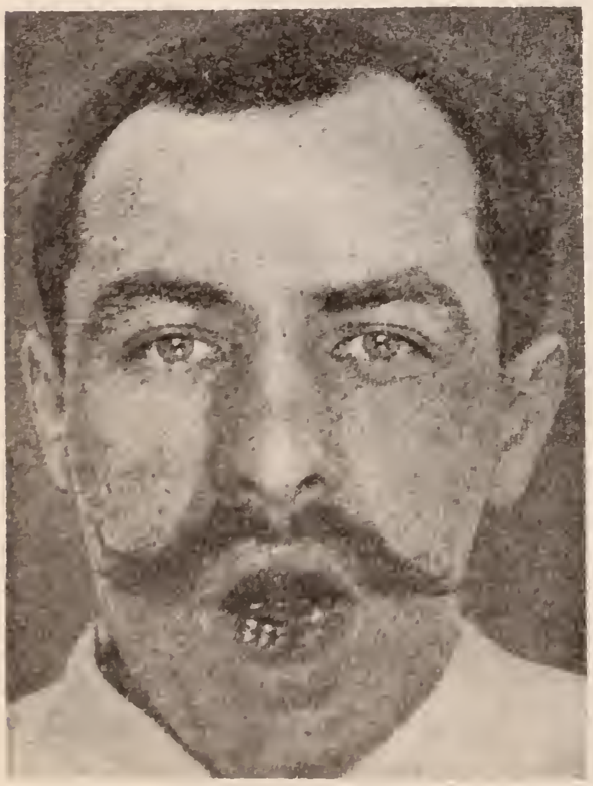

Fig. 70

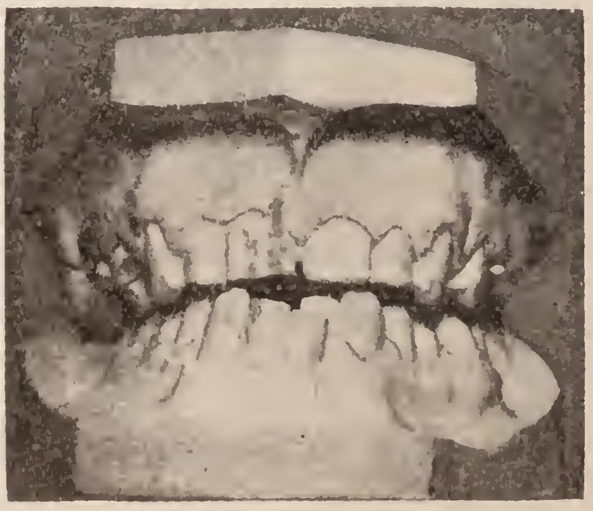

Fig. 71

Fig. 70 shows a case of fracture at the symphysis with loss of substance and the right central incisor, the bullet striking the chin at the right of the median line, passing along the outer plate, with exit through the cheek near the mental foramen on the right side. This case did not receive dental treatment for six months after the injury, at which time consolidation had taken place with overlapping of the front teeth (*Fig. 71*), with persistent suppuration in the line of the fracture internally.

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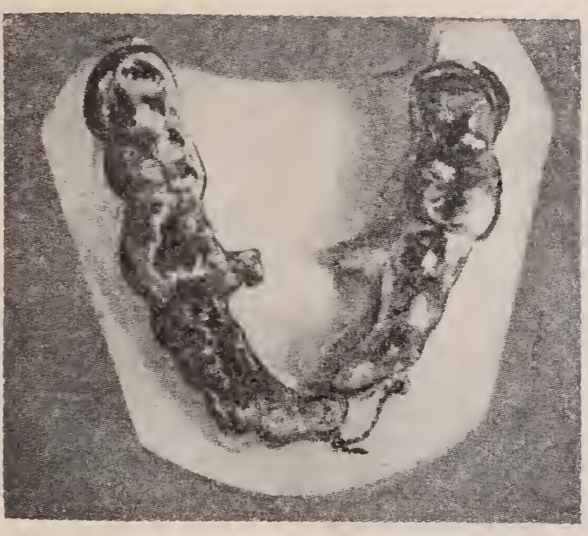

Fig. 72

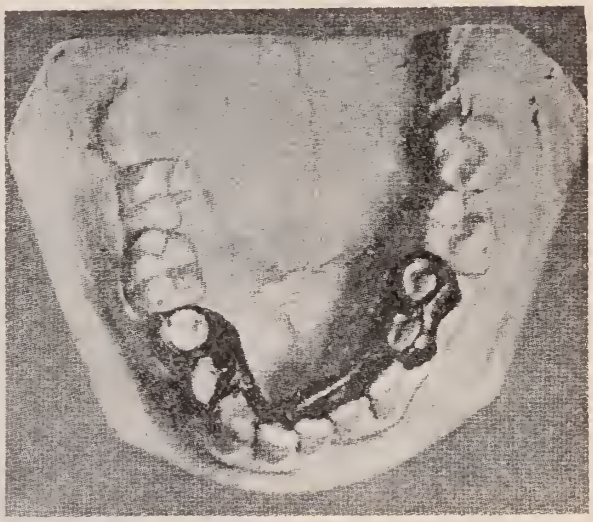

Fig. 73

To treat this case the jaws had to be spread apart. This was done by swaged German silver splints adjusted on the lower right and left sides of the arch. A jackscrew was used for the purpose of spreading the lateral halves. (*Fig. 72.*) Later a bridge splint was cemented to place. (*Fig. 73.*) Complete consolidation took place in about six months.

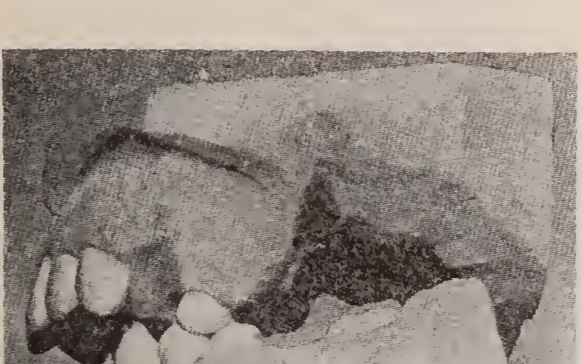

Fig. 74

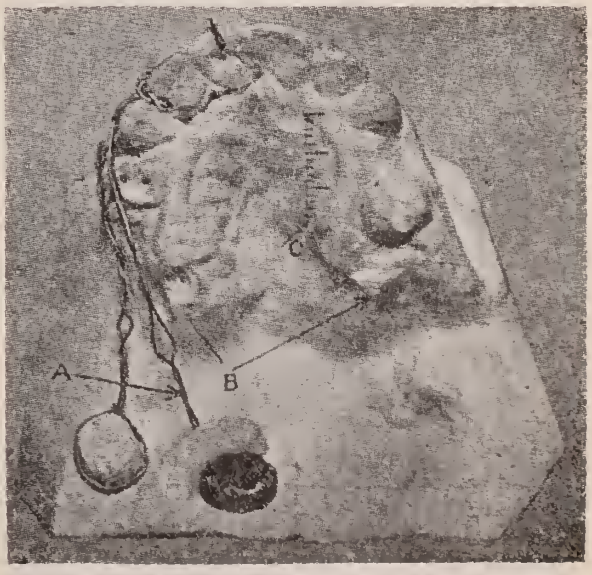

Fig. 75

Fig. 74 shows a very interesting case of gunshot wound across the superior maxilla where the anterior portion was cut off from the posterior portion, the anterior portion being thrown forward a distance of 2 c. The ball entered the cheek just above the opening of the Steno's duct, passing directly across the mouth with exit on the opposite side, fracturing the maxilla and forcing the nasal bones into the antrum. The tuberosity with all the molar teeth on the left side was gone, the anterior portion loosened and movable. The treatment consisted of suturing the mucous membrane to place. Irrigation with simple antiseptic mouth washes many times a day was instituted. The displaced parts were drawn into closer proximity by the use of twisted wires. (*Fig. 75*). One of these wires posteriorly was fastened to the upper molar tooth. Another wire posteriorly was fastened to the soft tissue, using a Brophy lead plate for this purpose. *Fig. 76* shows parts approximated. A simple obturator was used to close the opening in the hard palate. Consolidation took place in four months.

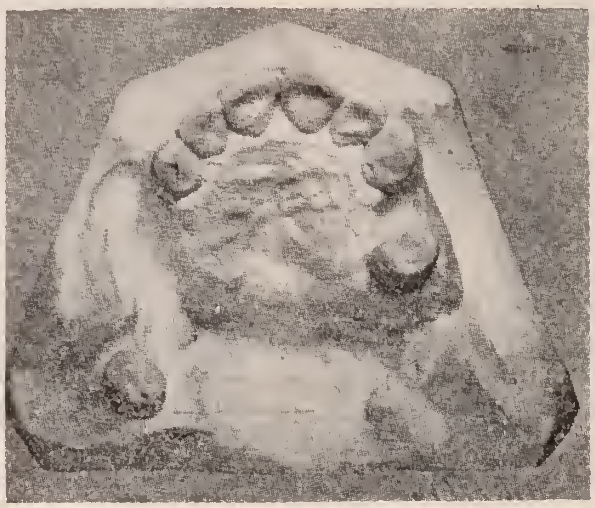

Fig. 76

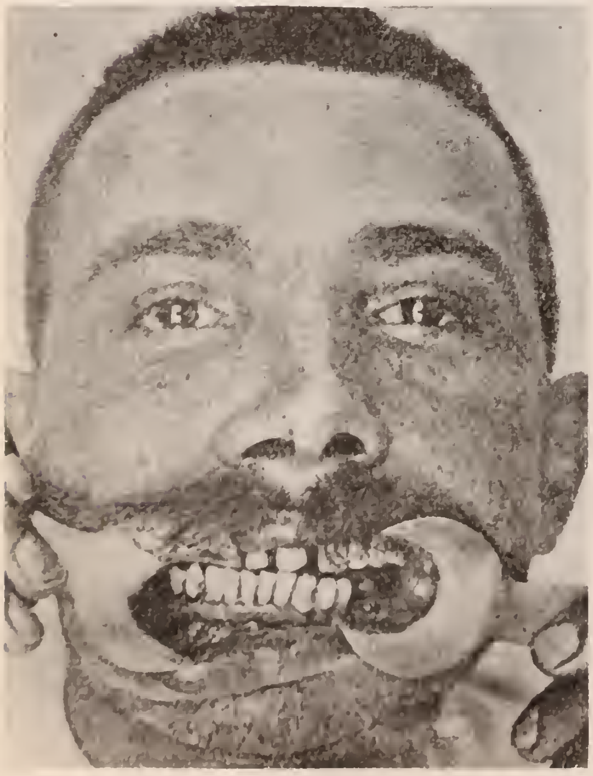

Fig. 77

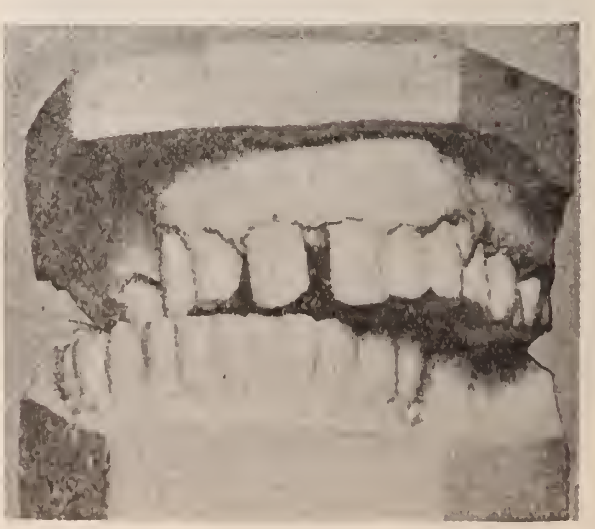

Fig. 78

Fig. 77, illustrates a compound fracture of the jaw with lateral displacement. *Fig. 78,* plaster casts of mouth. The patient was wounded by a bullet striking the right cheek just back of the commissure of the lips, striking the ramus and fracturing the jaw at the angle. No dental treatment was instituted for seven months, at which time the wound was found to have healed externally, the body of the jaw being carried out of line to the right by the width of three incisor teeth. Movements of the mandible were limited, rendering mastication impossible. Lower right first and second molars were loose and involved in the fractured portion.

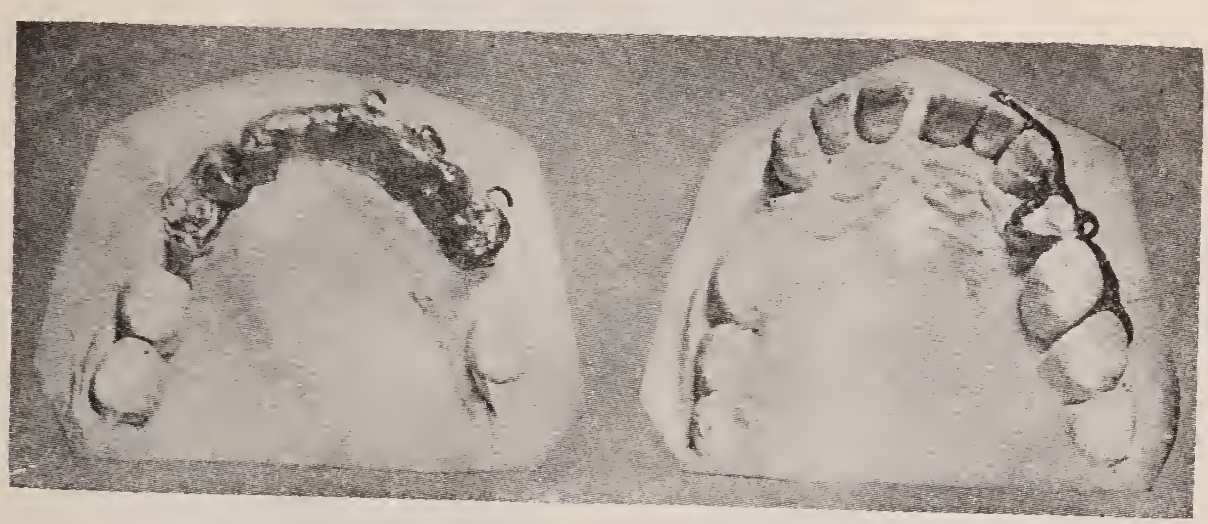

Fig. 79

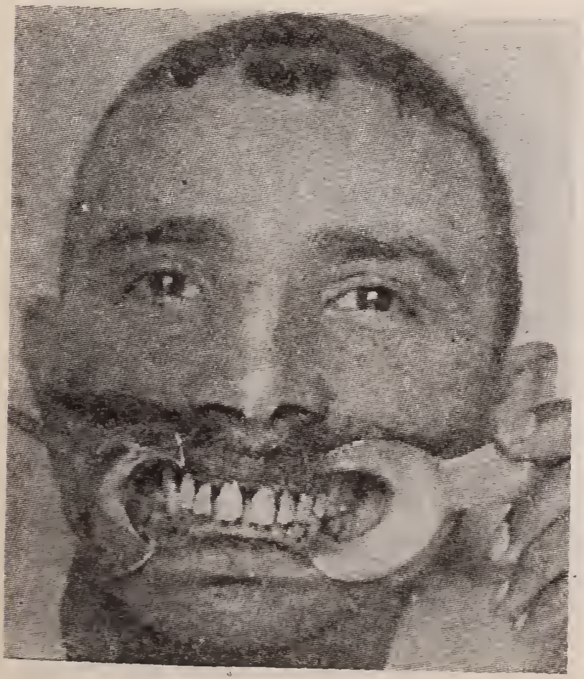

Fig. 80

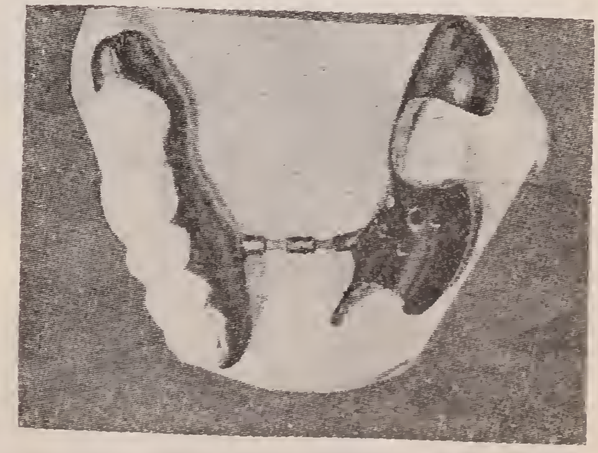

Fig. 81

The treatment consisted in the removal of these two loose teeth and a splint made of swaged German silver which was cemented to the lower teeth, extending from the left second bicuspid to the right second bicuspid (*Fig. 79*), with hooks for intermaxillary elastics. On the upper left first bicuspid a metal band was adjusted with wings extending to the lateral and the second molar on the buccal surface, to increase the base of resistance and a ring to serve as a point of forced application.

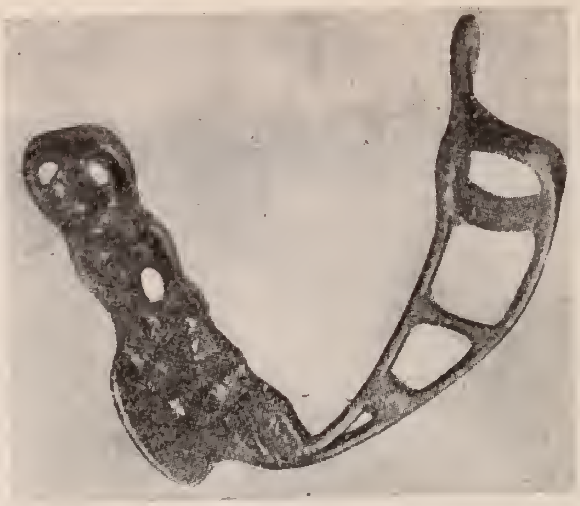

Fig. 82

Intermaxillary elastics were applied and worn continually. Normal occlusion was established in thirty days. (*Fig. 80.*)

Fig. 81 shows a method of obtaining normal occlusion and also a retention splint. This patient presented a double compound fracture of the mandible with loss of substance; was without dental treatment for five weeks and was wounded by a ball which, after passing through the

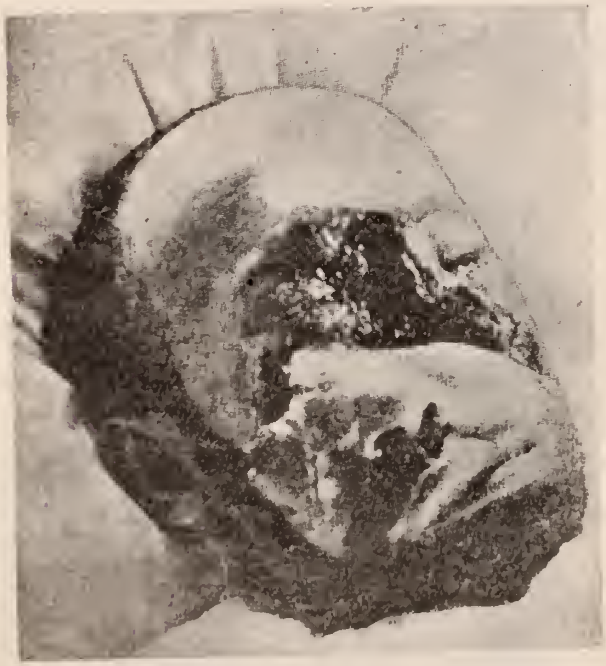

Fig. 83

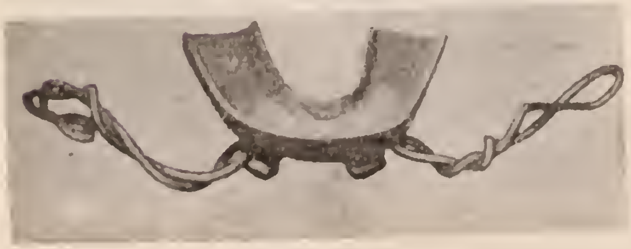

Fig. 84

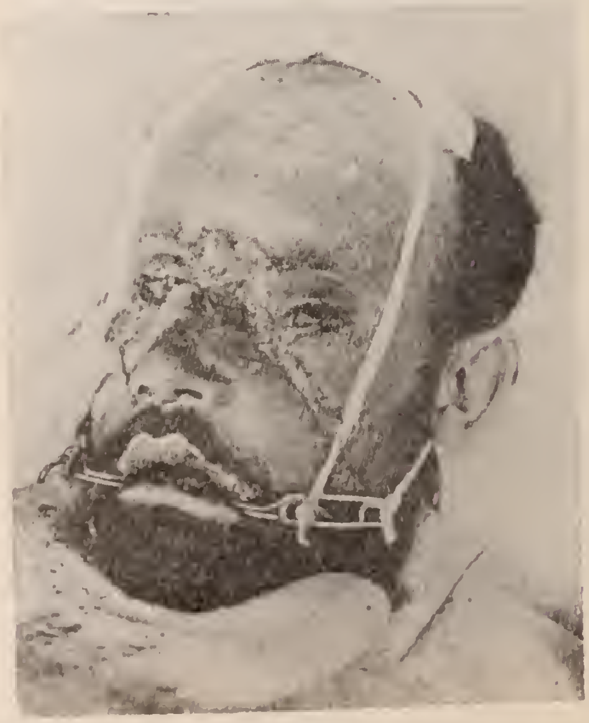

Fig. 85

shoulder, entered the left cheek, fracturing the lower jaw in the region of the mental foramen, and also at the symphysis, with loss of bone and four teeth. At the time of the beginning of dental treatment the sides of the jaw were drawn together in a V shape, bringing the two cuspids in contact. A partial fibrinous union had taken place. The mouth was in a very infected condition. The treatment consisted of adjusting vulcanite plates connected by a jack screw for spreading the lateral halves. These were made from two impressions taken separately. Sufficient spreading to establish normal occlusion was obtained in fifteen days. These vulcanite plates were then removed and replaced by a metallic splint. This splint was made as follows: on the right side a piece was swaged to cover the crowns of all the teeth with the cusps uncovered for close articulation; on the left side a band on the molar united by two strong bars reinforced; on the right side a metallic wing

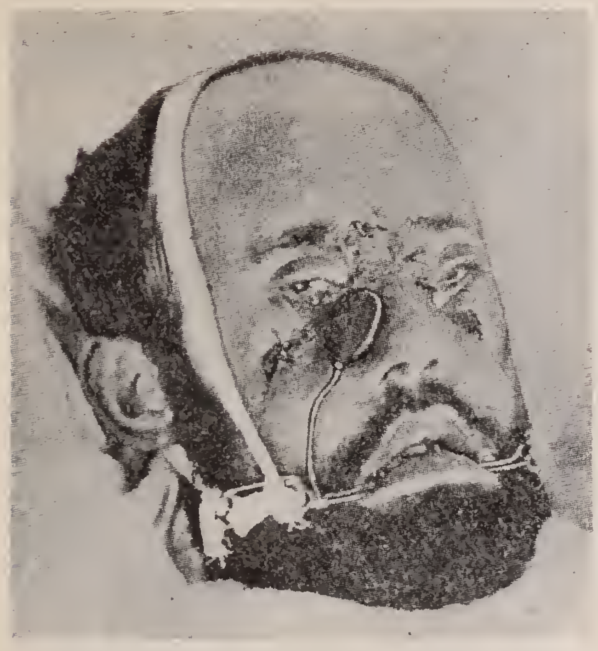

Fig. 86

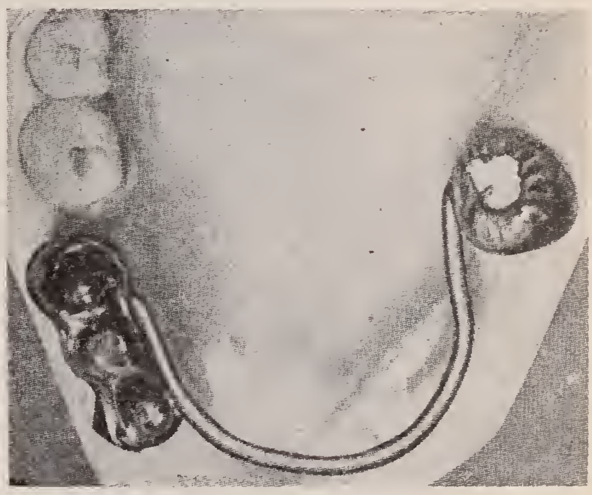

Fig. 87

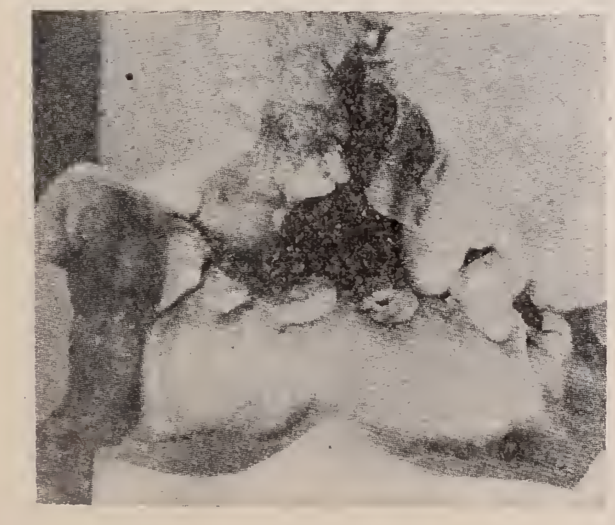

Fig. 88A

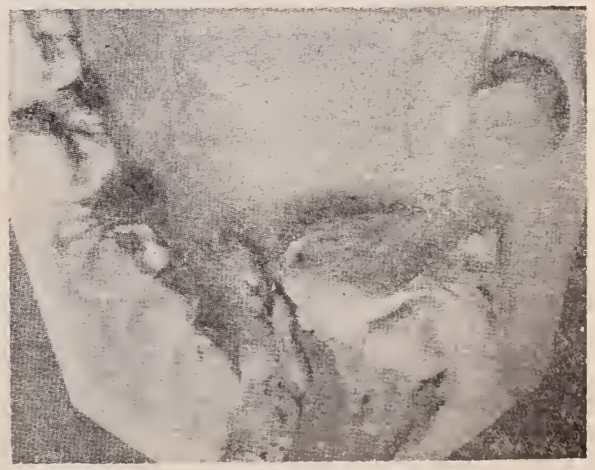

Fig. 88 B

was added buccally to overcome the tendency to return to its original position. This also aided in relieving the strain on the molar. This band on the right molar also carried a wing extending backward over the inner plate of the jaw for additional support. (*Fig. 82.*) After four months incomplete consolidation only had taken place.

Fig. 83 shows an interesting case of gunshot fracture and ingenious method of treatment. This patient had been wounded by a piece of shell striking the face from left to right, making a clean incision with little loss of substance, symmetrical in line from the root of the nose obliquely downward, backward almost to a level between the corner of the mouth and the tragus of the ear, sectioning off all the bones of the nose, maxilla and palate, and fracturing the molar and bicuspid teeth above on both sides. The entire section had fallen forward, leaving a large, gaping wound of wedge shape, disclosing the pharynx from above. No dental treatment was instigated for seven days after the wound.

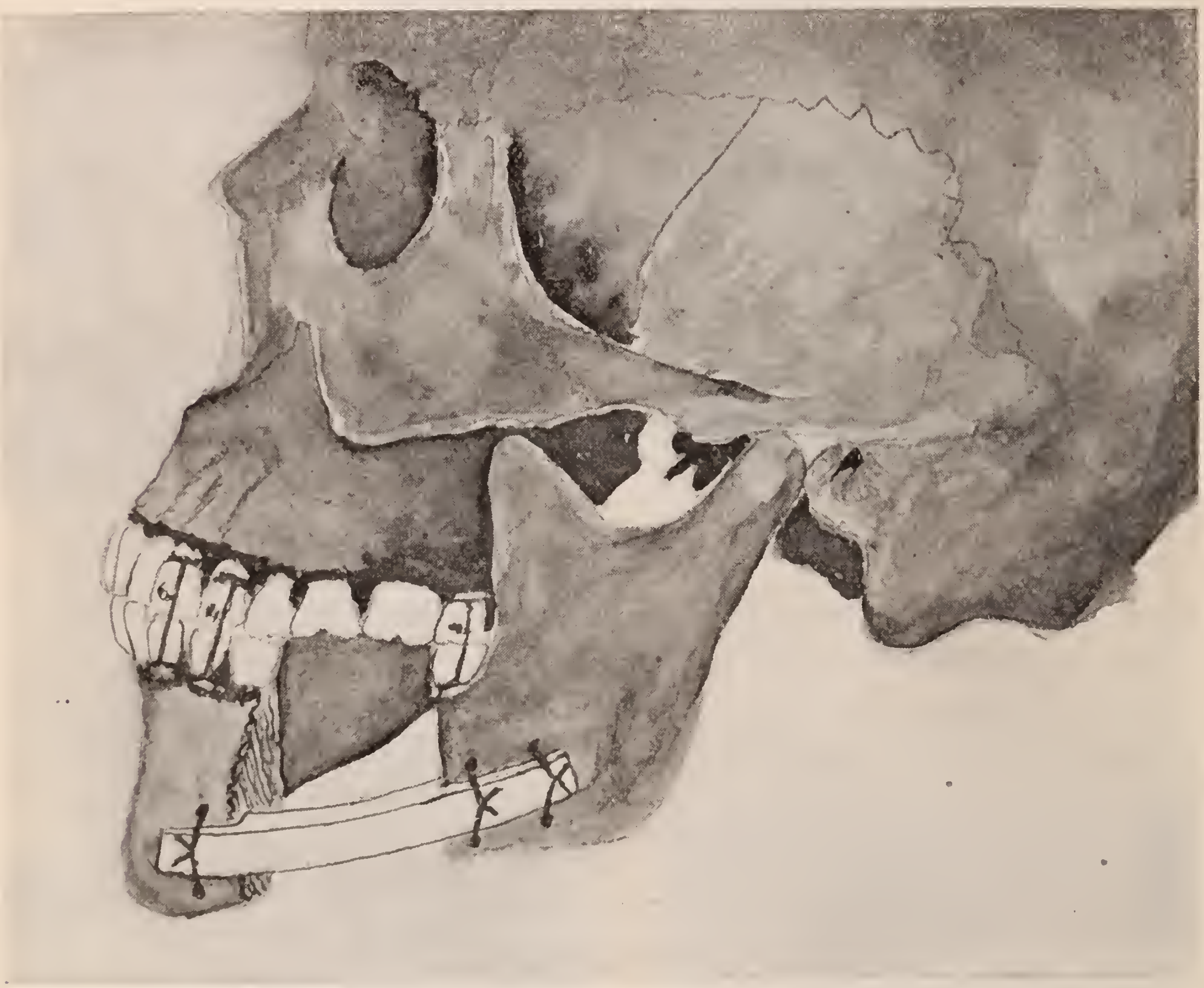

Fig. 89

The treatment consisted of adjusting a dental impression tray (*Fig. 84*), with wire attachments to the maxilla, passing out of the corners of the mouth, extending backward onto the cheeks. This permitted the whole sectioned-off portion to be lifted up to place. This splint was maintained by linen bands over the head. (*Fig. 85.*) The mouth and wound were washed every two hours, and once a day the splint was removed and cleaned and readjusted to hold the face in proper position. Later on a buffer to support the nose was added to the wire splint. (*Fig. 86.*) The patient was out of bed in thirty days, with partial consolidation of the parts.

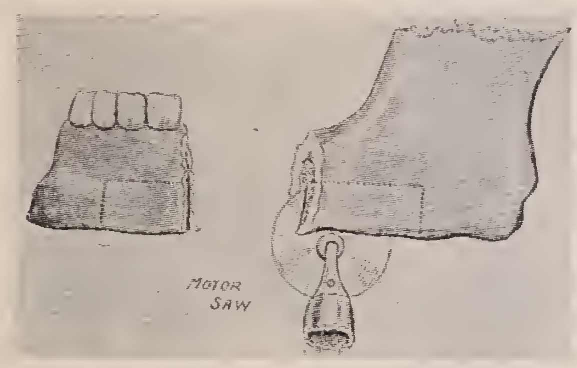

Fig. 90

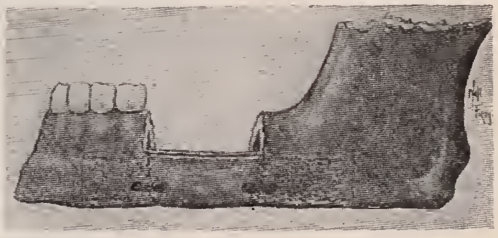

Fig. 91

Fig. 87 represents an orthodontic splint which was used successfully in the treatment of one of these gunshot fractures. The patient was wounded by a ball entering the open mouth while talking, fracturing the mandible as indicated by *Figs. 88A, 88B.* Many of the teeth and a portion of the bone were shot away. The exit of the ball was through the submaxillary triangle on the left side. There was extensive suppuration both externally and internally. Twenty-seven sequestra were removed. Perfect bone union took place by the use of the simple, removable, regulating splint which also served as a retainer. No intermaxillary ligation was resorted to. In two months and a half perfect consolidation had taken place.

The above cases vividly illustrate that in gunshot fractures of the jaws, individual ingenuity in the diagnosis and the selection of the treatment to be pursued, will play a very important part in the restoration of them. No two cases will present the same difficulties nor require the same treatment. Each case when presented should be studied from every angle before instigating the treatment, with the view in mind of restoring normal conditions as nearly as possible.

TREATMENT OF FRACTURES OF THE JAWS WITH LOSS OF SUBSTANCE, BY BONE GRAFTS.

The first authentic report of successful bone grafting was done by Merrem in 1809, when he experimented on bone grafting in skulls of animals after trepanning.

In 1858 Ollier, after extensive investigation on animals and on human subjects, concluded that bone grafts covered with periosteum remain viable.

It has been clearly demonstrated by Albee, Gallie, Robertson, Phemister and others, that autogenous grafts, or those derived from the individual into which they are to be engrafted, are the most successful.

Albee states, "That the fluids, albumins and tissues of every individual vary in degree from those of every other, and while the incompatibility may be slight, it is sufficient cause for using, wherever feasible, the individual's own tissue for the repair of his defects."

Fracture of the jaws from gunshot wounds causes almost an universal loss of substance, and where this loss of bone is sufficient to cause a marked deformity with loss of function of the jaws, the bone graft should be resorted to, provided the resistance of the patient and tissues will favor the repair.

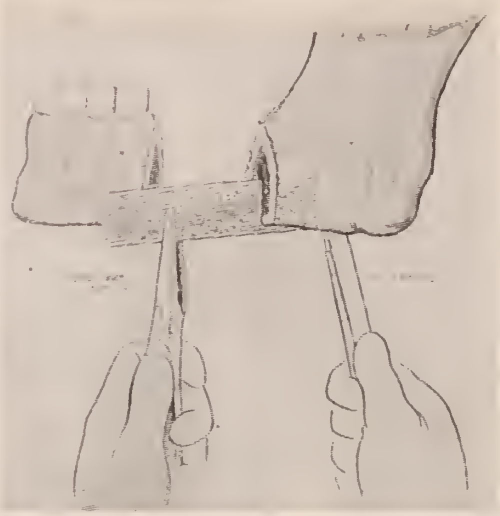

Fig. 92

In bone grafting about the jaws there are two fundamental principles which must govern the operative procedure. First, the whole operation must be done extra-orally so that no part of the wound comes in contact with the bacteria-laden fluids of the mouth. Second, the upper and lower jaws must be absolutely fixed by means of interdental ligation so that there may not be the slightest movement of the parts.

The graft should be placed into the lower portion of the mandible and should be shaped so as to conform to the contour of the lower jaw.

*Albee's method is to cut a section of bone from the tibia, the size and shape that is desired, by means of twin motor saws. He then cuts a gutter on the lower and outer portion of the mandible of exactly the same size. Then holes are drilled through the lower portion of the mandible on either side of the prepared gutter. The inlay bone graft is then adjusted to place and retained by means of kangaroo tendon sutures, which are passed through the holes and tied around the graft *(Fig. 89, after Albee)*.

†Drs. W. E. Gallie and D. E. Robertson of Toronto have done most satisfactory work in bone grafting on the jaws of soldiers who have lost sections of their jaws through gunshot fractures.

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*Albee—Bone Graft Surgery.

†Jr. American Medical Assn., April, 1918.

Through the courtesy of these gentlemen the author is able to give a brief review of their work with illustrations.

Just what takes place in the behavior of the tissues in the process of bone grafting is summarized by them as follows: "When a piece of living bone has been separated from its circulation and implanted elsewhere in the body of the same patient, the immediate result, as indicated in specimens recovered within a few days of the operation, is the coagulation of all cells and vessels to which the surrounding lymph is unable to percolate. This means the death of all the cells in the lacunæ and most of those in the Haversian canals. This is indicated by the immediate change in the staining property of the protoplasm and nucleus, and is later proved by the complete absorption of these structures after the lapse of from three to four weeks. On the surface of the graft and in the open mouths of the Haversian canals, however, are many osteoblasts which are in a position to absorb nutriment from the bathing lymph, and these cells are capable of living and proliferating and of producing those changes that make the autogenous graft so valuable in reparative surgery.

"At the end of the first ten days after the implantation of the graft, the proliferation of these osteoblasts proceed to attack the dead bone of the grafts, and rapidly produce excavations about the edges which are at first filled with proliferating cells, and later by new bone laid down by these cells on the walls of the excavation.

"While these changes are occurring on the surface, a re-establishment of the circulation has been taking place, as the result of the ingrowth of new blood vessels into the mouths of the Haversian canals. This proceeds with extraordinary rapidity and in small transplants, is complete in approximately two weeks. Along with these blood vessels, the osteoblasts spread inward from the surface, and at the end of three weeks the same changes that have been described on the surface are occurring within the substance of the bone. At first cavities are excavated along the course of the Haversian canals not far below the surface of the bone. Later this cavity formation, which appears to be a solution of the bone by a secretion from the proliferating osteoblasts, spreads deeply into the transplant, until ultimately the whole graft is permeated by blood vessels and osteoblasts that are occupied in the absorption of the dead bone. A few days after the formation of a cavity by these proliferating osteoblasts, the older cells return to their adult function of bone production, and soon the older part of the cavity becomes lined with a layer of new bone. This layer increases in thickness and trabeculæ develop from wall to wall, until the whole cavity is filled with living cancellous tissue, except in those areas in which the proliferating cells are continuing the work of excavating."

The technic used by Drs. Gallie and Robertson of inserting bone grafts in the jaw, is as follows:

The fragments are exposed by a long incision along the lower border of the jaw. The motor saw is then applied to the fragments, and a saw cut made along the inferior border extending an inch, to an inch and a half back from the end of the fragment, about half an inch deep. (*Fig. 90*). Great care must be taken to avoid opening into the cavity of the mouth or into the sockets of the teeth. An osteotome is then driven into the saw cut and a greenstick fracture produced, widening the wedge-shaped gap for the reception of the graft. An interdental splint which previously has been cemented to the teeth of both jaws is now locked with the teeth in normal occlusion. The graft is made by resection, three inches of a rib. This piece of rib is then split on the flat in order that the endosteal surface may be bathed in lymph. Half of the graft is then driven into the slots in the fragments, the smooth side of the rib facing toward the mouth cavity. This leaves the rough, cancellous surface of the graft facing outward and sunk somewhat below the outer surface of the jaw. (*Fig. 91*). This depressed area is then filled out by laying a piece of the other half of the rib in the gap with the smooth side out. The fragments and grafts are now fastened solidly in place with kangaroo tendon passed through drill holes. (*Fig. 92*). This adds additional security although it is really unnecessary, as the principal graft is self-retaining, being wedged solidly into the saw cuts in the fragments.

Homoplastic bone grafts, or those from another individual, may be employed in operations about the jaws, but not with the same certainty as the autogenous, for the reasons already stated. In the use of homoplastic grafts there always is danger of transmitting disease from the donor to the host.

In the operation of bone grafting, strict asepsis must be used. The inlay bone graft and also the groove in the body of the fragments into which it is to be inserted, should be subjected to the minimum amount of traumatism. Bruising or comminution of these tissues is not permissible if success is to be assured.

Bone grafting following gunshot fractures of the jaws should not be resorted to until after the soft parts have resumed their normal position and function, and when the patient has resumed his normal resistance.

This operation is contraindicated in patients with low resistance, or in patients suffering from certain acute or chronic diseases which will exert an influence in retarding the process of repair of bone.

(To be continued.)

THE SHOCK PROBLEM AS IT RELATES TO DENTISTRY.*

BY ROBT. L. WHEELESS, D.D.S., DALLAS, TEXAS.

THE SHOCK PROBLEM and the shock mystery are modern terms used to define shock conditions. From these doubtful names it is to be inferred that shock is a condition at present little understood. From the various theories advanced to account for this phenomenon, it is all the more evident that much is yet to be learned regarding this peculiar state of being; however, we know that shock does exist; that it is to be reckoned with and that it can be combated; so from this data we must work until the true solution is forthcoming. From the wonderful amount of work that is being done in the war zone on this subject, it is to be hoped that a true solution will be arrived at soon.

Shock, as it is understood now, is a condition produced by a profound impression upon the cerebro-spinal axis by severe injuries, surgical operations, or great mental distress, conducted through some afferent nerve, or through the circulation, or through the kinetic system, which is composed of a group of organs of which the thyroid, the suprarenals, the liver and the muscles and brain are a part, which system in turn is acted upon by emotional and traumatic stimuli. As Crile has stated, "If the stimuli are overwhelmingly intense, then the kinetic system, especially the brain, is exhausted and even permanently injured."

Shock is divided into two classes, one in which the depression is extreme, and the other in which great excitement is present, the latter being more rare in occurrence. The shock state may be reflex and slight, like temporary faintness, which soon passes away, or so severe as to induce a vital depression that is almost instantly fatal. It has been shown that it is not the bullet in the heart that kills, but the impression upon the whole system which is its consequence. In such an instance, shock is the direct result of the impact, but no less fatal may be the indirect effects of the mental impression.

The difference between shock and collapse is not easily made plain, nor is it necessary here to draw a fine discriminating line; it is sufficient if we consider shock as either the effect of physical or mental violence, while collapse is the consequence of continued exhaustion.

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Thus the impact of the bullet may cause shock, but the slow bleeding that follows may end in collapse.

Shock is arbitrarily defined as a reduction of arterial pressure to or below fifty millimeters of mercury, together with the usual conditions. The most vital effect of shock may be said to be the impairment of the vaso-motor mechanism.

There are many kinds of shock, including the following: Emotional, shell concussion, traumatic, surgical, toxic, exemic shock, and last, wound shock.

Shock is more severe in women than men, and in nervous and sanguine than lymphatic individuals; in those weakened by suffering than strangers to illness; in those predisposed by fear, by disease of the kidney, chronic cardiac disease and alcoholism. Children seldom suffer from shock.

In all cases of shock, the mental condition plays a mighty important part. It might not be amiss to quote here from one of Shakespeare's characters, as the quotation so fully expresses the effect of the psychical condition of the mind upon material conditions, and especially suits this subject. Richard III, who murdered his kin to gain the throne, is awakened in his tent upon the night preceding the battle of Bosworth Field by a vision of his murdered victims; he is terrified and rushes from his tent, exclaiming, "Shadows tonight have caused more terror to the soul of Richard than can the substance of ten thousand soldiers." So in all shock condition, the "shadows" are a very important part of the condition, if not by far the most important.

To discuss shock at the present time and overlook shell shock would be a serious error, as this condition of the shock problem is uppermost in every one's mind just now, and as there is a great difference between this condition and ordinary surgical shock, it is well to take note of same. The difference mentioned is this: we have seen that surgical shock is principally a circulatory condition in which the principal effect upon the central nervous system is produced by a change in the circulation, and by the change in the vaso-motor mechanism, with a fall of blood pressure to or above fifty millimeters of mercury; while in shell shock we find that the disorder is more of a nervous condition, or a condition of paralysis, which are not different from the paralysis of civil life, and with the senses impaired, which is not true in surgical shock. Again, the blood pressure in these conditions is below 110, and never above 135. These conditions occur frequently, which does not happen in surgical shock. Temperature in surgical shock is subnormal, whereas in shell shock it is not.

Shell shock is a blanket diagnosis to cover all traumas or disorders to the central nervous system occurring during modern warfare, or hysteria occurring in persons free from hereditary antecedents, but with a mind more responsive to physical stimulus than normal. True, shell shock is a trauma to the central nervous system without visible injury, and is accompanied by loss of consciousness, loss of memory, motor and sensory changes, such as paralysis and disorders of gait, dreams of terror and mental changes, special sense disturbances, as smoky vision, speech, hearing, taste and olfaction. Cardiac vascular patients complain of palpitation and breathlessness on exertion, and precordial pain, pulse small and increased in frequency. It has been observed in Europe that soldiers who have become vicitms of shell shock had for several days before their collapse given evidence that they were fast approaching the limit of their nervous endurance. It is believed that had something been done for them during those critical days, they would have readjusted themselves quickly and gone back to their duty, instead of remaining nervous invalids, with little prospect of recovery before the end of war. Nervous breakdowns often begin by sleeplessness, persistent homesickness, nervousness, depression, self-reproach and unreasonable fear, suspicion of others and general complaints of ill health. During the first part of the war all nervous conditions were placed under this head.

The dentist does not come into contact with the great amount of shock conditions that are encountered by surgeons and their assistants, who have charge of surgical cases, but his work is such that he is open at all times to conditions which, if they should occur, would be fully as serious, and the consequences far worse. By talking to our surgeon friends on this subject, it will surprise us to learn of the prevalence of this condition in surgical cases and the number of fatalities that occur from this cause.

It would appear that there is nothing today that the dentist should give more attention to than the prevention of shock in all cases, even down to the prevention of shock to the dental pulp through the placing of metallic fillings too closely approximating the pulp. The day of long, tedious dental operations is passing away as civilization advances, banishing those things detrimental to the human economy; so must we adopt methods that will make man's stay upon this sphere more endurable, for as life becomes more complex and the pace gets harder for the human to make, his resistance to hardship and pain becomes less. "The species of animal now dominating the world more completely than any other is at this moment in a state of abnormal activity. The backwash of the European war is seen in the quickened pulse everywhere, even in this land. Not only in war, but in peace also the complicated machinery of civilization created by man often drives him to his own destruction." Fortunately, science is advancing apace, and holds out means to us with which to combat this tendency of the race—that is, his lessened resistance to pain, and along with it, shock. Especially is this true in reference to anesthesia, which is on a more standardized basis than ever before, thanks to the marvelously-advanced methods that are being developed for us, if we will only avail ourselves of them. I am sorry to say that the cost price seems to be the gulf that exists between ourselves, the patient, and their more general use.

Among the cases which come under the dental surgeon's care, in which shock may likely occur, we may class the following:

First: The lancing of abscesses, especially deep-seated ones, of which we are called upon to treat quite a few. I am led to place this condition first as a shock producer, as I remember in my own experience, I believe, that this condition causes more shock, fainting and anemia to patients than any other, as by the time the abscess has pointed, the patient has become so debilitated and exhausted, and resistance is so lessened that he readily succumbs to the effects of shock.

Second: I would place extraction operations, both ordinary and long, tedious ones. Even in simple extractions, patients often have every symptom of shock before ever the operation is started; this is a case of gaining the patient's confidence to relieve the condition, by not too showy use of instruments, and the hastening of the operation.

Third: In cases where we have the misfortune to break off a tooth in extraction, and spend minute after minute working to get the root, driving the patient nearer and nearer to the shock stage all the while. These cases are the ones that should be treated with an anesthetic, especially a general one.

Fourth: Exposure of pulp sometimes causes a great deal of shock, sometimes by merely a touch, so that it is advisable to use a short anesthetic and avoid this condition.

Fifth: In the case of bed-ridden patients, shock is to be looked for, and as seriously avoided as the given conditions will permit, remembering that their lessened resistance makes them more susceptible.

Sixth: Prolonged dental operations, which it should hardly be necessary to mention, as this feature of dentistry is, or should be, already understood by dentists.

Most of us have had cases of shock in our practices, although in most instances the condition is usually emotional or psychical and is easily handled, though this is not always the case. I might cite several cases that I have met with in my own practice. They were mostly simple conditions, and I might say that I never have had a case of severe shock.

A Mr. E., age about fifty-three, tall, angular, and of nervous temperament, presented with a deep-seated cavity in upper left bicuspid with slight exposure, as I later learned in making an exploration with an explorer. Upon the explorer touching the exposure, patient suddenly became pale, eyes dilated, and cold perspiration appeared; the patient did not lose consciousness. The chair was tilted and stimulants used, and patient slowly became better, and left the office in about a half hour. At another time there were no shock symptoms.

H. Family: Two young men in family on several occasions previous to having dental work done, while seated in dental chair before any work was done, showed every symptom of shock, pale, dilated pupils, staring expression, fall in temperature, cold perspiration. On noticing condition, did not work, but advised to return shortly after a meal, which was done and work was finished in very short appointments. This, I think, was primary shock, and the next thing was to gain the patient's confidence. I suspected some systemic trouble of a cardiac nature.

Mr. T. A young man about twenty-five, presented with a bad third molar for extraction. Upon making attempt to deliver the tooth, patient became pale, eyes took on a staring appearance, cold perspiration and every other symptom of shock appeared. The work was stopped and treatment for this condition was given, and on his becoming better, the patient was dismissed and was advised to return next day, when tooth was removed after quite a siege, the patient behaving beautifully. I account for the change in the patient's demeanor by the fact that primary shock was overcome by overcoming the mental attitude of the patient, by gaining the patient's confidence, and by impressing him with the fact that I did not wish to have him bear too much pain.

No doubt you gentlemen can relate some more serious cases.

A state of exhaustion may follow dental operations, as it does surgical procedures. It is known to the profession as dental fatigue; as a matter of fact, it is nothing more than shock.

"The value of prophylactic remedies before operations lies in their preventing shock to the nervous system, either by stimulating it so as to withstand the disagreeable impressions, or stupefying it so as to make it insensible to them. In either case, the primary shock is correspondingly lessened or inhibited. The entire confidence of the patient once secured, especially that of a child, the nervous system will, without injury, undergo or even be insensible to pain, that under other circumstances would be unbearable, because the deadly influence of shock will be avoided."

Blair has stated that, "it is easier to prevent shock than to effectively treat it, and until we learn the true pathology of shock, all treatment must remain empirical."

Varied as are the views of the exact nature of this condition, there is a unanimity of opinion that the prime essentials in the treatment are bodily warmth and mental and physical rest, everything done to restore the normal blood flow, and anything unfavorable scrupulously avoided. Morphin in small doses hypodermically is often useful. If stimulant is administered, it is possible that a syringe full of neutral camphorated oil injected every half hour will be found as useful as any other, and open to fewer objections. In ordinary shock cases, the patient's feet should be raised higher than the head, unless position causes cyanosis.

More patients should be taken to sanitariums by dentists and operated under the proper conditions. This fact is best realized by men whose work deals with the more serious dental ailments, which border on shock-producing conditions. We all know the facility with which work may be done under the proper conditions, and how difficult is the same work if conditions are not right. Our patient will readily see the necessity of accepting such advice, and appreciate our efforts to a greater extent.

"It is because of the limiting of primary shock that operations under the influence of anesthetics are possible and safe, that otherwise would be fatal. The beneficence of these agents and the glory of the discovery of anesthesia is not confined to the immunity from pain which they give, but they have saved lives almost innumerable through their making feasible operations that before were impracticable."

"In nitrous oxid and oxygen analgesia and anesthesia, and novocain and suprarenin anesthesia, and their combined use in anoci association, it is evident that we have found the greatest pain-relieving agents for the benefit of suffering humanity."

Nitrous oxid and oxygen combined is one of the most effective shock absorbers known to the medical and dental science, provided it is used by an operator of experience. Dr. Bibble Duffield, of Philadelphia, after four years' use of this method and with a record of several thousand patients treated, reports a percentage of ninety-eight successfully culminated, the two per cent. of failures being due to the pathological condition of the patient.

That the bombardment of nerve centers by stimuli of peripheral impressions may cause shock, is shown by the fact that if a nerve from a part is thoroughly injected with novocain, so that it will not transfer impressions, operation upon the part produces no shock. This known method of anoci association is the basis for the present method of conductive and infiltration anesthesia. This is the most talked-of method at the present time, and promises much to our profession, and from a scientific standpoint it seems to be correct. There is no doubt that but for the shortage of novocain in this country for the last year or so, this method would be in more general use. In the South this principle has been gaining favor but slowly, but there must be great merit to conductive anesthesia from the glowing articles that we see in the journals from time to time.

The value of ether in preventing shock conditions is almost too well known to the profession to mention. For the prolonged operations it is the ideal anesthetic. It is the anesthetic for short operations that the dentist should make a more careful study of, and use in preventing pain and shock, as the major portion of his operations are of short duration.

Dr. Riethmueller states that no dental operator who is familiar with but one method should consider himself competent in anesthesia, nor can any dental office which offers anesthetics of but one kind be regarded as being sufficiently equipped.

"If the public generally would learn to look upon the Dentist in his true light—that of one whose mission it is to avert pain and suffering—he would be regarded with much greater favor and would enjoy higher consideration. But the nature of his work is such that like the general surgeon, in his efforts to forestall future anguish, he often brings present distress, and for this reason is avoided."

When patients remark to us how marvelously dentistry is advancing these days, it sometimes seems paradoxical to us, when we consider how little thought is given to the prevention of shock in our practices. It is true that dentistry is advancing in this field as in others, but it might as well not be advancing if we do not advance with it and master the methods of averting pain and suffering, thereby gaining greater favor and the enjoyment of higher consideration. Let us work on the assumption that pain and shock are unnecessary, and think of our patient as though he were in the first person singular, and surely our profession will attain its true place in the sun.

A little booklet, "Prophylactic Rhymes," has been printed by the Oral Hygiene Committee of the Dental Society of the State of New York, to appeal directly to children. It is the intention to teach them in an attractive and impressive manner the necessity of caring for their mouths and teeth. The Committee is placing the booklet on the market with the hope that it will be of value in the Oral Hygiene movement.

Information and a sample copy may be obtained by writing Dr. Arthur W. Smith, 33 Chestnut St., Rochester, N. Y.

MOUTH HYGIENE AND PHOPHYLAXIS: THE NEED AND VALUE OF EDUCATING THE PUBLIC IN THE SAME.*

BY W. M. BOURNE, D.D.S., SAN ANTONIO, TEXAS.

IN OFFERING for the consideration of my professional brethren a paper on the above-named subject, I do so realizing the greatness of its magnitude, and in the space allotted I cannot hope to go into detail and discuss its many phases, all of which are important, but only mention some of the most common, and offer some suggestions which seem to be practical, and which can and should be used in bringing about better health conditions to the entire human family.

To some, at least, this subject may seem a bit trite, but I believe you will agree with me that the unclean, diseased oral cavity is contributing more to the ills and ailments of mankind than any other one thing. I grant, however, that neither the dental nor medical professions is now or ever has been free from "hobbyism"; and systemic diseases through mouth infection, with some at least, has almost become a hobby, and might be carried to an irrational end; but this is the exception rather than the rule, and is applicable only to the over-enthusiastic who are prone to accept a supposedly-new discovery or theory before it has been proven. As professional men we recognize a preventive medicine and dentistry, and if this be taught, learned and practiced, we need have no fear of the "hobbyist."

The greatest of human blessings is health, but anything that gives us freedom from pain, increased capacity for enjoyment and greater ability to serve, without increasing the expense of human existence or energy, is not only a physical blessing, but beyond question of great economic value. Therefore good health is an economic as well as a physical problem.

Mouth hygiene is not something new but in former years was recognized as an adjunct to general hygiene, but in recent years it has become of such importance as to assume the dignity of a separate branch of health, and as such, we naturally expect the dental profession to take the initiative and assume the leading role. The neglect of the mouth with decomposing food in the inter-proximal space, decayed teeth with suppurating roots and gums reeking with pus, is not only a menace to health, but should be regarded as a serious and dangerous condition; for aside from the annoyance, pain and impaired mastication, systemic infection, septicemia and death have been the frequent sequelæ.

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Both medical and dental professions have, today, within their grasp the greatest facilities and opportunities of their entire history. The X-ray and microscope have taught us dentists, especially, that we are treating complex human organism, and not teeth only. The physician realizes, as never before, the importance of mouth infection in systemic disease, and the necessity for the assistance of the dentist in combating the same, and if by co-operation we can in some way impress upon the public the need and value of observing the laws of hygiene and prophylaxis, many ailments can be checked in their incipiency, or cut off at their very source.

Ignorance is an enemy of humanity, and if people only knew and observed the laws of health, a vast amount of latent potential capital would be conserved, and their ability and usefulness increased many folds. Hence good health is an economic asset.

If any part of the human body becomes diseased or suffers from any cause whatsoever, all parts are affected in relative proportion. This is not a matter of opinion, but an axiom, fundamental and inherent; and he who disregards this truth must inevitably suffer the consequences. Complete functional activity depends upon entire systemic integrity, and this fact should ever be uppermost in the mind of every one who is engaged in the healing art. Let me emphasize these facts for they are of prime importance, as they form the very mudsills upon which the superstructure of health and physical manhood must be built.

Perhaps no part of the human anatomy affords so fertile a field as the mouth for the culture and propagation of pathogenic micro-organisms, and nowhere is the opportunity for prevention so great, and it is becoming the tendency more and more, of both medical and dental professions, to prevent when possible, diseases of the throat, lymphoid tissues, lungs, etc., by both therapeutic and surgical treatment. It is conceded by physicians that the focus of infection must be located, and if possible extirpated, in order to successfully treat systemic diseases, especially those of a chronic nature.

Before a patient can become the victim of general infection, the infecting organisms must gain admission to the general system through some primary focus, and the teeth and surrounding structures are often the site of this primary focus. This is not a generalization based upon possibility, but a fact demonstrated to the entire satisfaction of the investigating mind. Focal infection is not always easy to determine or locate, but the X-ray and microscope have proved valuable assistants in the hands of competent persons. By their use the etiology of many diseases, such as rheumatism, chronic arthritis, endocarditis, septicemia and tuberculosis have been determined and their source traced directly to the mouth. Many cases of acute alveolar abscess can be located only by the aid of roentgenograms. Prevention is always the ideal, but when this is not possible, every means at our command should be intelligently employed in eradicating the trouble and extending the crusade against oral infection.

The dentist who has thoroughly cleaned the mouth of a patient, instructed him how, and instilled within that patient a determination to keep his mouth clean, has rendered a far greater service than the dentist who has neglected this, although he may have made for him the most beautiful restorations of gold and porcelain. Prophylactic work, or cleansing the teeth of stain and calculus, is often turned over to an assistant, as it is considered of minor importance; but the day has come when we can save more lives by keeping mouths clean and healthy, than by constructing beautiful bridges. I believe the time is rapidly passing if not entirely gone by, when mechanics in dentistry, though of great importance, will hold the center of the stage and be considered the acme of professional service.

Among all mouth infections as potential trouble-makers, I deem pyorrhea, with its multiplicity of types and endless variety of graduations, the king; but if the mouth be kept perfectly clean, and the gum margins free from irritants, the king will soon lose both his terrors and his crown. No dentist who is indifferent to the hygiene of the mouth, and neglects those preventive measures which do more to elevate the standard of health than any other thing, is worthy the confidence and esteem of his clientele and the honor of his high calling. I feel that the oral hygiene movement is an opportunity for the dental profession to be of real service to humanity, not merely in alleviating suffering and distress that already exist, but in evolving a better race of people.

Too long the profession of dentistry has been content, seemingly, in treating conditions and symptoms, instead of ascertaining the cause and striking at the very fountain-head. In years past our dental colleges have been largely responsible for this procedure, as little stress was placed upon such subjects as biology, histology and pathology, and rewards offered for proficiency in operative and prosthetic dentistry; thereby acknowledging repair to be of greater importance than prevention or preservation. But the work that is being done by the profession among the school children shows a tendency for a change of attitude, besides being a vitally active force in the education of the public on preventive dentistry. It is also revealing the fact that the public is becoming aroused and beginning to realize that if we are to raise, or even maintain, our present standard of citizenship, we must look well to the health of the children, that we may prepare them for, and develop them into our ideal standard. To us, as dentists, belongs no small part of this gigantic task.

This is a time when conservation along all lines is being taught and practiced, but the public is slow to accept and practice any doctrine until made to appreciate its importance and necessity. The process of teaching may be a slow one, and you and I may not live to see our ideal fully reached, but that in no manner excuses us from giving this great problem our very best energies and efforts. Some one has very beautifully said:

"If you can climb to the top without falling, do it;
If not, climb as high as you can.
Man is not honored by busines or calling,
But business or calling is honored by man."

No one can achieve the highest and best in anything, without having an ideal. We must get a vision of the things to be done, and ever keep that vision before us. If our vision is lost, we at once become as a ship in mid-ocean without either chart or compass. How easy it is to do that which costs us little effort, or refrain from doing that which means no sacrifice; but this does not measure up to the standard. A wise man has said, "Where there is no vision the people perish." So in order that great results may be achieved, the public must also get and keep a vision of that which is to be accomplished; and we as a profession must not only do our bit, but do our utmost that latent, potential, as well as active energy and power may be conserved. Especially is this true in this time of great international distress and travail.

The education of the public on mouth hygiene and prophylaxis, thus far, only has reached the sentinels of the great army of humanity. We have only scratched the surface of the soil in the great field where the seed is to be sown. If we are to maintain our present standard of manhood and womanhood, the public must be impressed with the importance of keeping the mouth in a healthy, sanitary condition.

It is conservatively estimated that 85 per cent. of the human family are afflicted with pyorrhea, and its ravages and sequelæ are too well known to you to need comment. Eternal vigilance is not only the price of liberty, but the price of good health also. True, age lessens the vigor of all the organs and attributes of the body, but if the body be symmetrically developed, and its powers and attributes properly preserved and conserved, its symmetry and usefulness should continue even to the end of life. We can only hope for this when the most favorable conditions obtain, or our ideal is reached. This is beautifully portrayed by Oliver Wendell Holmes in that wonderful poem, "The One-Horse Shay."

Our professional literature, the past few years, has been replete with communications pertaining to mouth hygiene, but that the public may be reached and know what the profession is thinking and teaching along this line, much of a simple, plain, didactic nature should be found in our secular literature also. The time is ripe for this movement to sweep the country, and the science of conserving and preserving physical manhood through hygienic channels, is of the most vital and far reaching of any health issue with which we as a profession are confronted.

I gratefully acknowledge the fact that our State and National Hygiene Committees are at work and have accomplished something along this line, and that many of our great educational institutions have established chairs on sanitation, hygiene and public health, but I believe every educational institution, public and private schools included, should give mouth hygiene and prophylaxis a prominent place in their course of study, that children early in life may form proper concepts of its relative importance to their future health and happiness. And our professional institutions, in their preparation of men and women who are to go out and become leaders and teachers in the communities where they serve, should place greater emphasis upon such branches as strike at the very fountain-head of that which is causing so much distress and suffering to the human family.

The home and the school, two of the pillars of all society and government, in which is found the young mind plastic and susceptible to impression, are perhaps the most fertile and fruitful field, but we must not stop with the youth but extend the crusade until it reaches people of all ages, classes and conditions of life. The lecture platform, the stage and the moving picture should all be employed in an ethical way in the dissemination of this important knowledge. Every man, woman and child should know that health, happiness and longevity of life depends very largely upon perfect functioning of the masticatory organs, and this can obtain only when the entire oral cavity is in a state of perfect health.

Books of almost every description, and printed in many different languages, are to be had at a reasonable price; our mail service brings to the homes reading matter ranging from the small country town weekly to the large city daily, and from the cheapest of cheap story papers to the scientific journals and magazine; few indeed are the homes where one or more of these periodicals are not found. People also realize today as never before that reading is essential to their success and happiness. And aside from news and information on general topics, many, many people read and appreciate articles on educational and scientific subjects, if written in a simple and attractive manner, and especially is this true when appertaining to their own well-being. It has been said:

"We may win without credit, backing or style,
We may win without energy, skill or a smile,
We may win without aptitude, patience or wit,
We may even succeed if we are lacking in grit;
But take it from me as a mighty safe hint,
Civilized folks cannot win without print."

Acknowledging the press as the most powerful agency in eradicating ignorance and moulding public thought and opinion, let us employ it in a legitimate, scientific, ethical manner, and we as practitioners, by word and works, do our utmost to carry this propaganda to every family hearthstone. And with the slogan, "Let no tooth ache," let us add another, "Let no mouth be unclean." Let us consider this as a serious problem, and meet it and treat it as it should be done, intelligently and efficiently.

Great achievements along every line of endeavor have been accomplished by men who have sacrificed both brain and brawn, and were possessed with a determination to dare and to do. Individual effort, for which we are truly grateful, has accomplished much, and we still want individual activity, but dentistry cannot grow and develop as she should without united action.

In this mighty, world-wide crusade, which I trust it will become, I appeal to you that we equip ourselves as men, standing four-square shoulder to shoulder, ambassadors and servants of the truth, doers and not hearers only, with sincerity of heart, earnest in purpose and enthusiastic in effort, keeping ever in mind the past, rich with priceless experience and knowledge given to us by her heroes and her seers, considering the present with all we have and are, earnestly looking to and working for the future, infinitely richer in hopes and aspirations.

THE BUSINESS SIDE OF DENTISTRY.*

BY W. S. LOCKE, D.D.S., CINCINNATI, O.

SOME YEARS AGO I read a paper before the Odontological Society of Cincinnati upon the subject of "The Business Side of Dentistry."

I had but a short time before that come from the business world, where I had been schooled along such lines that, when I got into the practice of dentistry and learned how the professional man carried on the financial side of his profession, I was amazed and wondered how he lived, and why he so little valued the great investment that he necessarily had made in order to become proficient to take his place as a professional man.

I, of course, was young and inexperienced in the ways of our profession and I did not know that it was a crime to breathe of fees, of consolidating of ideas, and consulting one another upon business as well as professional methods; so, innocently, I took it upon myself to read a paper and enlighten them, to tell them they should get together, talk over business methods of running the office, keeping books, collecting bills, making renewed appointments for future dates, keeping tab on the poor-pay patients, the duties of the assistant, etc.

When I got through (and some of them could hardly wait until I did get through), you can imagine what happened to me. I always have been thankful for one thing, the society at that time was composed of only about twelve members.

They went at me, first one, then another, until I wished I had forgotten to come. One excused me by saying he was aware of the fact that I was from the business world, where the prime object was money. He informed me that I must turn my mind to higher thoughts, to thoughts of elevating myself and my profession, and that of serving the public, and never to speak of prices or business methods.

He did not see (as was the case), that the profession as a body, though partially successful professionally, were failures financially. He had overlooked the fact that he owed a living to his family and himself before every other thing. It had been my idea then and it is more impressed upon my mind today, that in order to become a successful practitioner you must be a good business man.

In the business world we have our grain exchanges, coal exchanges, bankers' associations, etc., where men congregate not only to buy and sell, but to learn how to carry on their business and increase their profits. Business consolidation is what it means, for the harmony and benefit of all concerned.

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* Read before the Cincinnati Dental Society, Feb. 22, 1918.

The average professional man has never had business experience or training. He thinks all that is necessary to do is to provide himself with professional knowledge and the money will flow in streams into his bank account. Now we are greatly mistaken if we think the man in the business world has but one idea or goal, that of making money. Our profession in the last few years has made many strides, but as compared to the industrial world we have stood still. Wonderful things have been invented and developed. The goal on the part of business men no doubt is money, but to make money they must develop and to develop they must have money. So it is with the professional man. Be professional in every sense, but don't overlook the first idea that prompted you to study dentistry, that of making a good living (and I dare say most of you thought it an easy way to do it). However, after you got into the profession you allowed yourself to be bluffed out of the original idea of making a living, by the suggestion that you become professional men instead.

If you or I had all the money we wanted we would not have become dentists, nor would we have gone into any other business. No one ever had enough money; many have had more than they needed, but all would be willing to take more. No man ever retired because he had all he wanted, but only because he had all he needed, or possibly of old age or ill health. To be successful surely does not mean to die a pauper or to spend your last days in the poorhouse, telling your friends what a success you were in your practice. Let your financial standing show as a part of your success. If we did not have our societies, our journals, and assist one another professionally, how far advanced do you think the profession of dentistry would be today? The barbers still would be pulling teeth. Our financial and business methods have advanced just about that much.

There should be some business principles employed in the practice of dentistry, and it will be hard for one to forge ahead without the consolidated help of all. Has it ever occurred to you that the average professional man has no money, no system for handling his business, making appointments, keeping accounts, figuring expenses, profits, losses, income, collecting accounts and paying bills? Did it ever occur to you that the average professional man has no credit, or if he has it is very limited?

Now why cannot we put ourselves on a higher plane, bring our rating up to the average of the good, successful business man? We are entitled to earn much more than we do and collect it promptly, that we in turn may meet our obligations and save money. A professional man should derive from his practice during his active years a competency for those years when his earning capacity will be shut off, and he is not only required to earn but to conserve as well. We hear a great deal about conservation these days, but conservation of our earnings is as necessary in our business economics as is the conservation of our natural resources to our national life and progress.

Now with these thoughts in mind, and notwithstanding the grilling your essayist was given when he read the paper to which he has referred, he cannot resist the temptation to take up the subject again and try to present a few ideas that might be of value to you, and I hope you will take more kindly to what will be said than those did who listened to him away back in the dark ages. Uncle Sam is on my side now and he is going to see to it that you run your business and keep your accounts in a business-like manner; and if you do not you likely will be confronted one of these days with an officer dropping into your office to examine your accounts, and if you cannot convince him that they are correct you may be liable to a heavy fine.

It is my intention to touch lightly upon most subjects pertaining to the business side of dentistry, so we will begin with our entrance into the profession.

HOW TO GET NEW PATIENTS AND WHAT TO DO TO RETAIN THEM

When entering the profession of dentistry, our resources to obtain the proper clientele must be, first of all, a well-equipped office, neat, clean, and in every way up to date. The next and I think even more important, is the personality of the dentist. The making and maintaining of a successful dental practice depends largely upon this personality, as would be so in all other professional callings where the individual comes in direct contact with those whom he or she serves. The clientele hear of you and are first attracted to you because of your reputation. To retain them you must assure them and make the impression that you have the ability.

Your instruments must be clean and appear so. Your bracket must have nothing on it when they take their seat and everything must have a place and be in that place. You must be prompt, polite, talk only to those who wish to be talked to and never force the conversation. If you take their time, they will take yours.

Cultivate the good will of the children, treat them with every consideration you would a grown person, and they will go home and say you are a "nice man." Take them into your confidence, never deceive them and they will grow up and esteem you as a friend and their influence will be of value to you. To be both affable in manner and skilful at your practice makes a very strong combination.

Do not become identified with politics, avoid expressions of radical views and never enter into an argument with patients.

Never make promises as to the stability of your services. Remember all material things crumble and waste away and your work is likely to go sooner than you expect.

You must have the patience of Job, regardless of what may happen. Never lose control of your temper.

Never try to handle more than one patient at a time and give that one your undivided attention, that you may charge them for your full time.

Do not make too many appointments for a single day or you will find yourself dodging or postponing one appointment to meet another. Leave some vacant time every afternoon, for when that day approaches you will find that time will be needed for emergencies.

When a patient presents himself or herself for examination, make as many appointments as will complete the work and make them as close as treatments will allow. You will be surprised to find that your appointments need not run so far ahead as usual. Your patients will be pleased and you will do your work better and get your money more promptly.

If you are slow in handling your patients. you get tired of them and they of you; and you will find yourself dragging the work into weeks and months, wasting your time and theirs; and they will be just as slow in paying as you were in giving the service. Never let your patients get too well acquainted with you. You will waste time talking to them, cheapen your practice and make them slow pay.

In the former paper the writer suggested the plan of calling up or notifying patients for a subsequent appointment, say in three or five or possibly eight months, and remind them that it was time to have their mouths examined. This met with great opposition from all, saying that we had no claim on our patients and should not suggest their return. The writer always has practiced it and advocated it. His patients like it and say, "When you want me send for me." This not only keeps you busy, but you can render better service to the patient, control your appointments and keep all broken time filled.

OFFICE ASSISTANT

The right office assistant is one of the greatest resources of a dental practice: so that, in selecting one for the position see that she has the following qualifications: education, refinement, a personality which includes a pleasing manner, a voice well modulated, neatness of appearance, attentiveness and willingness to work. You may ask, "Where is such a girl to be had?" There are plenty of them if you will pay them what they are worth. You cannot get a private secretary for $3.00, $6.00, or $8.00 a week, and if you find a girl willing to work for such a price she will be worth nothing to you. She will not be an assistant, only a gum-chewing, novel-reading office girl. Start them in at a salary that will be worth while, and it will give them an incentive to apply themselves to the best of their ability. Train them to do their work thoroughly and insist upon their handling your patients pleasantly but in a business-like manner at all times. As quickly as they accomplish one thing well, add another and so on until all their time is taken. Teach her the motto, "Know the true value of time." Never do yourself what your assistant can do just as well. The writer's plan has been to tell his assistant that when she can accomplish this or that her salary will be so much, until now he has little to do and she gets all the money. Always treat them with great respect and kindness. Never call them by their first names. It always cheapens them in their own estimation and in the eyes of your patients, who will likewise call them by that name.

It is very important to train them to handle the telephone properly, to send and receive messages and always leave a pleasant impression. In fact, it is more important for any of us to be more pleasant when talking over the phone than at any other time. Remember you cannot be seen and your voice may sound gruff or short.

Never have your assistant ask the name of your patient when they ask for the doctor. Instruct her to say, "The doctor is very busy; may I take the message?" The chances are they will get the name and the message. If they do not and they insist upon talking to you, you know you will go anyhow, name or no name; so why ask it? It appears to show a preference. In the office it is different. All should be asked to give their names, for many come in to take your time with that which does not interest you. Place upon the assistant all the detail work, other than the operations in the mouth. Burden her with all the things to remember and insist upon her remembering them or making a note of them. Have her make and renew all appointments, keep your books, and write your letters.

DUTY TO YOUR FELLOW-DENTIST

Under no conditions discredit another dentist; if you cannot praise, excuse him as best you can or say nothing. If his work is up to the average speak well of it, and when patients come to you for advice or to be enlightened about what the other dentist is doing, always refer the case back to him. It will make him speak well of you. Never comment on the work of others unless it is good and under no condition do work for patients or their families who are referred to you, except that service for which they were referred. How many times has it happened where cases have been referred to you for special service, where they will say, "Doctor, you just go ahead and do all the work." Under no condition should you do it. They will often say, "Well, I am not going back to Dr. X. again and you might as well do it." Simply say to them that having been referred to you for special service, it is impossible to give any other service; and I will assure you that both doctor and patient will approve of that honesty, and send you many others that you will have the right to work for, making it pay you in more ways than one.

FINANCE

In order to have a nice office, wear good clothes, have a little recreation and get a decent burial, it is necessary to have money. To have money we must charge a reasonable fee for our service. We should know who our patients are and if they are able to pay for that service. We should keep our accounts in such a manner that at the end of the year we know just what business we have done. This cannot be accomplished unless we keep an account of our transactions, with every dollar we receive or expend. Accurate accounts should be kept with all creditors as well as patients. Every transaction should be recorded and your books balanced from time to time. While this balancing does not prove your books correct, it shows a credit for every debit and there must be two mistakes, or duplicates of two, if they balance and are not correct. As I previously have said, the income tax collector reserves the right to look over your accounts, and if you cannot show him your just expenditures, he has the power to make such allowances as he may see fit, deducting that amount, together with the one or two thousand (as the case may be), from your gross income and charge your income tax against the balance. So it behooves you to keep accurate account of all your receipts, expenditures and losses. Put yourself on a salary and you will save money. In keeping accounts do not overlook the sending of all bills monthly. Send every account, whether the services are finished or not. Every honest patient wants to know what the bill is going to be, and it is due them to know; and those who are not so honest cannot dodge the final appointment near the end of the month so that the bill may run to the end of the following month. This is practiced more than you think.

Do not suggest part payment of account by having such a space printed on bill heads, neither attach printed slips or any printed matter such as "Please remit" or a demand to pay. It suggests to them that your slow-paying patients are numerous. Write it with pen that it may give the impression that they are the exception.

The writer does not agree with Dr. Barber in many of his statements. We believe in talking over financial affairs and if possible consolidate ideas and adopt similar methods for the good of all, but it is the intent to keep our profession well separate from our financial affairs. To speak of selling a case (as he tried to teach us), is belittling ourselves and profession in the eyes of the laity. Such talk before them eventually would place our services upon a decidedly commercial basis. While we can handle our records and financial affairs in a business-like manner we must not allow our patients to lose sight of the fact that we are professional men.

COLLECTING SLOW ACCOUNTS

We are all willing to do charity work, but we do not wish it forced upon us by those who can pay. Up to the present time the slow-paying patient has had a free hand, paying when he liked and not at all if he so wished. He has not been forced to pay because the professional man almost always loses when his case goes to a jury. So, if we desire to break up this habit, we must get some good consolidated plan by which all these people can be listed so that they will be known to us when they present themselves for service. There is no doubt that many a name is on the books of many of us, for they go from one to another as they wear out their welcome. This positively can be controlled and broken up, and better done by ourselves than through some commercial agency. There are many who will pay all bills promptly except to the professional man. They seem to think he can wait until they get ready to pay, should that time ever come. It is possible for us to break this up and a system should be planned to do it, but it can only be done by a concerted action of members of our societies.

In conclusion I wish to say that it is the belief of the writer that business training should commence in college; that a course should be given upon the business side of dentistry. Most young men and young women entering college have had no business training whatever, so we can hardly expect much of them when they start into practice.

To be strictly successful in the practice of dentistry or any other profession in its fullest meaning, the business side and the professional side must go hand in hand. It will not only be remunerative, but ethical as well.

The value and strength of an organization depends upon the men who compose it. Real men rise above circumstances and environment; at times they may falter but their failures they turn to success. They feel and know that everything has its part in the great system of life. Nothing exists that does not work in harmony with nature. From the dawn of the world we have seen man building and Nature brushing away. Man, selfish, haughty, aspiring has sought to build monuments to his vanity—yet time, the tomb builder, has left but little to mark the ruins of his ambition.—*Modern Methods.*

EXPERIMENTAL RESEARCHES IN THE WARMING OF NITROUS OXYGEN FOR ANESTHESIA.*

BY PAUL CASSIDY, D.D.S., CINCINNATI, OHIO.

IT IS A fundamental physical law that the transformation of a solid into the liquid state, of a liquid into a gas, deprives the surrounding media of a definite number of heat calories and, hence, brings about a lowered temperature therein.

The temperature of any substance is dependent upon the mode of motion of the particles involved. The particles of a liquified substance are not able to move with the same freedom as when that same substance is in its natural gaseous state. Hence any change from a liquid to a gas involves a greater freedom of motion of these particles, which very change in their mode of motion, in consequence, absorbs heat units from the surrounding media. We can, therefore, say, in unscientific language, that cold is developed in all things immediately surrounding any substance in the process of being changed from a liquid into a gas.

To assert that liquified nitrous oxid is any exception to this rule is scientifically absurd. Any experiments that have been performed, in good faith, which seem to indicate this exception have not been properly conducted and are, in consequence, of no real significance.

Having been a believer in warmed vapor for anesthetic purposes for fifteen years, I have been much interested always when the assertion has been made that nitrous oxid in particular does not require warming, as, indeed, it is always of the temperature of the atmosphere by which it is surrounded. A report of five hundred cases, with the varying results obtained in the use of warmed and unwarmed nitrous oxid administered for short-duration anesthesia, was made by me one year ago. Statistical reports of one man are seldom satisfactory to others and I expetced my findings to follow this course. My deductions, however, did call forth one assertion which I have felt it was to the interest of all finally to disprove. I had said that nitrous oxid flows into the anesthetizer at a temperature of anywhere from forty to sixty degrees, Fahrenheit scale. This was absolutely denied. To prove my deduction entirely a correct one, I decided to construct an apparatus that would permit of the accurate reading of varying temperatures within a nitrous-oxid anesthetizer. The result has only confirmed me in my belief and I submit it to you today, gentlemen, at least to indicate that there is a considerable danger to all patients anesthetized, for even a short time, with unwarmed, or inadequately warmed, nitrous oxid vapor, changed directly from the liquid state.

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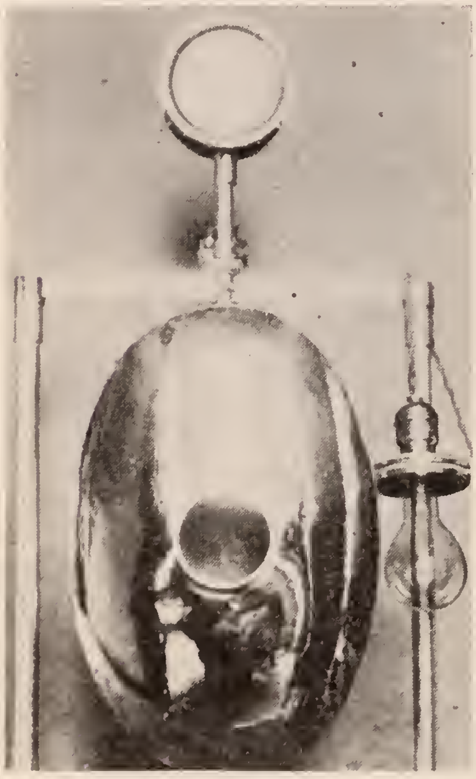
*Read at Joint Meeting of Interstate Association of Anesthetists and Mississippi Valley Medical Association, Toledo, O., Oct., 1917.

The title of this paper is wholly inadequate, and does not permit of the latitude which I would desire in the development of the entire subject of warmed nitrous oxid and oxygen for anesthetic purposes.

It may seem unnecessary to a majority of you that my note of warning, at this late day, should be uttered against the administration of unwarmed oxid. You have, all of you, administered this gas through heated and unheated anesthetizers. Some have continued, unthinkingly, to use the warming device for no other reason that it was considered the proper thing to do. Others, more observant of results, have discarded the warming attachments because the heated and the non-heated vapors apparently acted in about the same fashion. And they did; for the very simple reason that the heating devices attached to most of the anesthetizers on the market, are wholly unable to raise the gases passing through them to any appreciable extent. The heating chambers are so small and the heating elements of so little power that whether they are employed or not, the gases pass through them at practically the same temperature. You, therefore, who have abandoned your warming attachments on the assumption that all warming is unnecessary, have done so upon a wrong surmise. Inadequately warmed vapor is little better for anesthetic purposes than unwarmed vapor. This fact will hardly



justify, however, a refusal properly to warm the gases when this result can and should be obtained.

I have not come to you today in professional guise to cry the wares of any manufacturer of anesthetizers. I only assert that it is a fact that few, if any, of the machines that have been presented for our use will permit the gases passing through them to be raised to the proper temperature for anesthesia. If it is advisable to inject liquids for regional anesthesia at a temperature approximating that of the body, it is, at least, as necessary to administer gaseous anesthetics at about the same temperature when possible. I am confident that the very reason for the considerable success of the early users of nitrous oxid, even though their equipment was otherwise to be condemned, lies in the fact that the anesthetic was delivered to the patient at about the body temperature and with no pre-existence in the liquid state.

Properly to understand that these experiments were not conducted in a haphazard fashion, relying principally upon guesswork for results, as has been done in the past, a description of the apparatus employed will be necessary.

Recognizing that a thermometer placed at the exit of an anesthetizer could not accurately register varying temperatures; that it would be impossible to place one within a rubber bag where the differences in temperature could be read, I decided upon the construction of a metal bag, which, with a glass window through which to observe the thermometer, would permit of the immediate reading of all changes in temperature within the chamber, should any occur. This bag was built, of heavy copper plate, in elliptical form, with two flat sides. The capacity of the tank is about five gallons. An eighth-inch brass union, so called is soldered into the bottom and to this was attached the inlet tubing. At the opposite end of the bag were soldered two quarter-inch unions, one to be used for the outlet and the other as an attachment for a safety valve of the double-acting type. From one flat side there extended into the bag a copper can measuring three inches in length and the same in diameter. Within this was placed the electric heating element, after all joints were securely soldered to prevent air leakage into the larger can. Immediately above the opening into this heating chamber was placed a brass pipe which leads to a pressure gauge which is very delicate and was made for this purpose especially, registering accurately from naught, or rather from atmospheric pressure, up to an added pressure of six ounces. Into the other flat side of the bag a threaded ring, three inches in diameter, was placed. Upon this was screwed a brass cap, in the center of which is a glass window two inches in diameter. Through the exit in the top was passed a registering thermometer, reading from 32 to 200, Fahrenheit scale. This was attached firmly by brass wire soldered to the top of the bag.

I trust that this description of the apparatus will at least be sufficiently comprehensive to indicate that I have spared no pains to make the results obtained certain and conclusive.

Through a rubber tube three feet in length I passed nitrous oxid from a 1250-gallon cylinder into the unheated bag at a pressure of two ounces in an atmosphere of 80 degrees temperature and at the end of two minutes the registration of the thermometer had not changed. In four minutes, however, it had fallen five degrees.

Later, when the material of the apparatus had again assumed room temperature, nitrous oxid was again passed through at two ounces pressure for twenty minutes. When the experiment was begun the thermometer registered 81 degrees; at the expiration of the twenty minutes it registered 58, a drop of 22 degrees, or a drop of a little more than one degree a minute for the entire period.

After having turned on the electric current in the warming chamber until the temperature stood at 130 degrees, nitrous at two ounce pressure was passed into the bag for three minutes. A drop in temperature of one degree was noted.

With the thermometer registering 130 degrees, nitrous oxid, at a pressure of two ounces, was passed into the bag for ten minutes and a difference in temperature of eight degrees, a little less than one degree a minute average, was observed.

That gases, compressed greatly but not into liquid form, assume the temperature of the surrounding atmosphere unless placed in containers of non-heat conducting materials, is a recognized physical fact. For this reason oxygen in cylinders which have been within doors sufficiently long may be administered in very cold weather, over long periods, with impunity. This I proved by an experiment.

In an atmosphere of 70 degrees, into the unheated apparatus was passed oxygen for three minutes with no resultant change in the position of the mercury in the thermometer. At the same pressure and same temperature, oxygen was flowed into the unheated chamber for ten minutes without any change. After having passed oxygen into the unheated bag for twenty-five minutes without any drop in temperature, I felt the indication conclusive. On passing oxygen through the apparatus when the thermometer showed a temperature of 125 degrees for fifteen minutes, a drop of two degrees was shown. This resulted, I presume, from the gas passing into the chamber at a temperature of 76 degrees, robbing its superheated surroundings of some of their heat units and in this manner reducing the temperature of the bag slightly.

You may note that I was much more liberal in my experiments with oxygen than in those with nitrous oxid. The former I can purchase very cheaply. Not being attached to any public institution, where experimental material seems to cost little or nothing, I cannot afford to be entirely wasteful with nitrous oxid.

As a result of these experiments, I would conclude that in very warm weather, for anesthesias of no longer duration than two minutes, unwarmed nitrous oxid is equally as good as the heated gas; that in anesthesias lasting over two minutes the use of unwarmed nitrous oxid becomes progressively more dangerous with every added minute; that in an atmosphere of a temperature of not more than 70 degrees even the two-minute period is too lengthy. I have not been able to prove this last assertion because of the fact that as yet I have not had an atmosphere of 70 degrees in which to make it.

The purpose of this report I have made to you is that you may insist upon being provided with anesthetizers having heating chambers of a sufficient size and a heating element equal to the task of raising the temperature of nitrous oxid, as we use it, to the proper point to make its employment as wholly safe as we can wish, and as its great merits as an anesthetic agent so richly deserve.

Livingston Building.

If you think your house the best,
Tell 'em so;
If you'd have it lead the rest,
Help it Grow.
When there's anything to do,
Let the others count on you;
You'll feel bully when its through,
Don't you know.

If you're used to giving knocks,
Change your style;
Throw bouquets instead of rocks,
For a while.
Let the other person roast,
Shun him as you would a ghost,
Meet his hammer with a boast
And a smile—*Exchange.*

NASAL ANESTHESIA*

BY M. ECKER, D.D.S., NEW YORK CITY

NASAL ANESTHESIA is prima facie for the dental anesthetist, but only of secondary importance to the surgical anesthetist, and I believe always will remain so. Again and again, anesthetists for nose and throat work have tried the nasal administration of gas and oxygen and failed, or if they succeeded, it always gives the impression of the super-extreme effort moving along the narrow margin between success and failure. The best I ever have heard, is the opinion that the use of gas and oxygen only with a nasal inhaler for nose and throat work, is an acrobatic performance which is not called for by the circumstances.

I myself being a dentist, have no practical right to speak judgment on nasal anesthesia for surgical purposes; however, having met with great satisfaction in the nasal administration of gas and oxygen for dental purposes, I believe that my means for the purpose will also be of interest to the surgical anesthetists and it will be up to him eventually to try again, if he considers it worth while.

Anesthesia or analgesia is satisfactory, if the patient's condition is at all times such that at no time will it give you the apprehensive feeling that the patient is about to slip beyond your control. Perfect control depends on two factors: First—an apparatus which responds quickly with little manipulation, which pre-supposes, of course, a correct and easily visible indication of the amounts; and second—a nasal inhaler which actually delivers what the apparatus feeds and which, as a secondary consideration, does not interfere with the operator's hands.

Fulfillment of these conditions is giving me great satisfaction. The means I use is the Gwathmey Sight Feed Apparatus and a nasal inhaler of my own design.

With a dentist, perfect control of the apparatus, uniform gas flow, and simple handling, are perhaps of more importance than with the surgical anesthetist—because the dentist very often is both operator on the patient and operator of the apparatus, and even with an assistant to attend to the patient as well as to the apparatus, any change of conditions requiring additional manipulation, lack of uniformity of the anesthesia or analgesia are disturbing factors detracting the attention from the work on the patient. It is, I believe, due to this discrepancy, the excessive attention which the gas apparatus requires, that many dentists who had placed great hopes in the use of gas and oxygen for analgesic work have discarded their apparatus. I do not believe that I exaggerate in saying that with my present outfit, I am able to devote 99% of my attention to the patient. The sight feed is unquestionably the most practical indicator. When once the necessary amounts are obtained a glance over the shoulder suffices to reassure me that everything is running uniformly.

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* Read before the Interstate Association of Anesthetist, Toledo, Oct., 1917.

As stated in a previous paper, my explanation for the perfect control of the Gwathmey Apparatus is the low pressure under which it works, necessitating under hardly any circumstances a delivery pressure beyond 3 millimeters mercury, so that the old term, "forcing," as far as I am concerned, is eliminated. It stands to reason that a low pressure and smaller amounts of gas are easier manageable and, therefore, under better control, than high pressure and large volumes of gas.

The Gwathmey Apparatus has no gas bags, in which gas and oxygen have to collect before they enter under a supposedly-uniform pressure into a mixing chamber, and has not the big and stiff gas tube running from the mixing chamber to the inhaler. Instead of this the Gwathmey Apparatus connects from the sight feed by means of a small pliable rubber tube to a miniature breathing bag attached close to the nasal inhaler. This breathing bag, light and pliable, holds a larger volume than the bulky gas tube of other types, and is therefore of greater comfort to the patient's lungs if re-breathing is done. It is a cleaner proposition because it easily can be sterilized by removing it. Re-breathing through the rigid gas delivery tube is unsanitary. The adoption of the small nasal inhaler re-breathing bag and the discarding of the stiff gas tube means comfort to the patient and freedom to the operator.

From a series of tests with the mercury gauge attached on the gas outlet of the sight feed, that is, directly in the gas channel to the patient, I am able to state that the pressure never exceeded 5 millimters, and is on an average below 2 millimeters. I can furthermore state that the average of gas used is 1 gallon per minute, or 60 gallons per hour. This easily is determined since the sight feed holes are of a gauged standard and the amounts passing thru each hole are steady, without fluctuations if the gas valve is heated. This figure of 60 gallons per hour is, I am told, not far above the normal used for deep surgical anesthesia with the closed face inhaler, the average being 36 gallons per hour. From this I am led to judge that 10% of the anesthetic goes to waste on account of the open mouth with nasal anesthesia.

We all will agree upon one point, *i. e.*—that the open mouth in nasal anesthesia constitutes nothing but an opening for leakage. That opening for leakage is unavoidable, but the leakage is avoidable to a certain degree. This is not like an ordinary leakage such as, for instance, a leak in the gas delivery tube, which is *before* the gas reaches the patient and forms an absolute loss. This is a leak *after* the gas reaches the patient, a leak which is therefore under the influence of the patient's respiratory action, and is therefore partly under control. Grant that during an inspiration, when the pressure within the lungs is lower than the surrounding atmospheric pressure, a leak thru the mouth is *only* possible if we give the patient a considerable surplus over what he can take. If we avoid any surplus the patient will take all you give and all he needs—provided you give enough, and no loss whatsoever can occur—during inspiration. On the other hand, during expiration a loss is natural and much less within our control, particularly when patient expires through the mouth. But here also you must grant that the smaller the pressure the less will be the wastage thru the mouth during expiration. I believe that mouth breathers are the exception, and, that particularly, if you instruct the patient at the start to inhale and exhale through the nose, most of them will continue to do so to the end. I believe that with all nose breathers—provided always that you work under low pressure—the loss through the mouth is not even 5%, and with mouth-breathers no more than 15 or 20%. For consider, if you work with low pressure and patient expires a certain amount through the mouth, not all is wasted. The patient will re-inspire the contents of mouth and surrounding.

These percentages of loss, 5% or less for the majority (the nose breathers), and 15 to 20% for the minority (the mouth breathers), would in its average practically correspond to above-given figure of 10% loss in nasal anesthesia, as compared to the consumption of gas and oxygen in surgical anesthesia.

CONCLUSIONS

First: Nasal anesthesia with the open mouth for oral operations, if induced by the proper method, does not require "forcing."

Second: By "proper method" I understand in principal a low pressure apparatus and a flexible leak-proof delivery which includes a small re-breathing bag.

Third: The purpose of the re-breathing bag attached close to the inhaler is to facilitate free respiration under normal pressure, to secure a small percentage of CO_2, and *third* consideration to economize.

Fourth: The rhythmic motion of the re-breathing bag serves as a reliable indicator of the patient's condition.

Fifth: The sight feed in connection with a fine control, is of essential value for analgesic work.

147 Fourth Ave.

EDITORIAL

THE NATIONAL MEETING

The National Dental Association meeting held in Chicago, Aug. 5th to 9th, 1918, was one of the largest attended, if not the largest yet held.

The first day was devoted to registration, and meetings of the House of Delegates and Board of Trustees. The various dental fraternities also held meetings and banquets on Monday.

Tuesday morning the first general session convened in the Auditorium Theatre and the subject under discussion was "The Management of Pulpless Teeth." The several papers read were by prominent dentists, most of whom are engaged in research institute work.

Tuesday afternoon sectional meetings were held and many valuable papers, on subjects pertaining to the various branches of dentistry, were presented.

Tuesday evening a patriotic meeting was held in the Auditorium Theatre. Dr. C. N. Johnson, Chicago, gave an address of welcome which was responded to by Dr. Joseph Nolan, president Canadian Dental Association.

Colonel Wm. H. G. Logan, M. C., N. A., U. S. A., gave an address, "The Dental Profession's Contribution in the Present War."

Major-General Wm. C. Gorgas, Surgeon General U. S. A., spoke on the "Consideration of Some of the Important Changes that have been made in the Medical Department of the United States' Army During the Past Four Years."

Brigadier-General Robert E. Noble, Chief of Hospital Division, M. C., N. A., U. S. A., spoke on the subject, "The Surgeon General's Plans for Maintaining the Health of Our Soldiers."

Colonel Chas. H. Mayo, M. C., N. A., U. S. A., gave an address on the "Medical Progress During the Present War."

Lt.-Col. H. D. Arnold, M. C., N. A., chairman council on medical education, Amer. Med. Assn., spoke of the "Benefits to the Medical Profession and Schools from Higher Educational Standards."

A vast audience was present despite the extreme heat that the August weather supplied.

Wednesday morning and afternoon there were sectional meetings and Wednesday evening another general session and patriotic meeting. There was a presentation of a Service Flag on behalf of the local committee to the National Dental Association, by Dr. D. M. Gallie, Chicago. Acceptance on behalf of the National Dental Association by Major C. V. Vignes, D. R. C., and President-elect N. D. A.

Senator Borah, of Idaho, made a stirring patriotic address, and Lt. Vasile Stoica, Roumanian Legation, Washington, D. C., told of his experience on the battle front as a soldier with the Roumanian Army.

Thursday morning general clinics were held. Thursday noon a luncheon was given to former presidents American Dental Association, Southern Dental Association and National Dental Association.

Thursday afternoon occurred the dedication of the Black memorial.

Thursday evening a general session was held and the program furnished by the Canadian Dental Association.

Friday morning sectional meetings were held and at the last general session the new officers were installed.

For the coming year the officers are:

President, C. Victor Vignes, New Orleans, La.

President-elect, J. V. Conzett, Dubuque, Iowa.

Vice Presidents, T. L. Grisamore, Chicago; J. G. Fife, Dallas, Tex..

General Secretary, Otto U. King, Chicago.

Treasurer, Arthur Melendy, Knoxville, Tenn.

The next meeting will be held in New Orleans, in October, 1919.

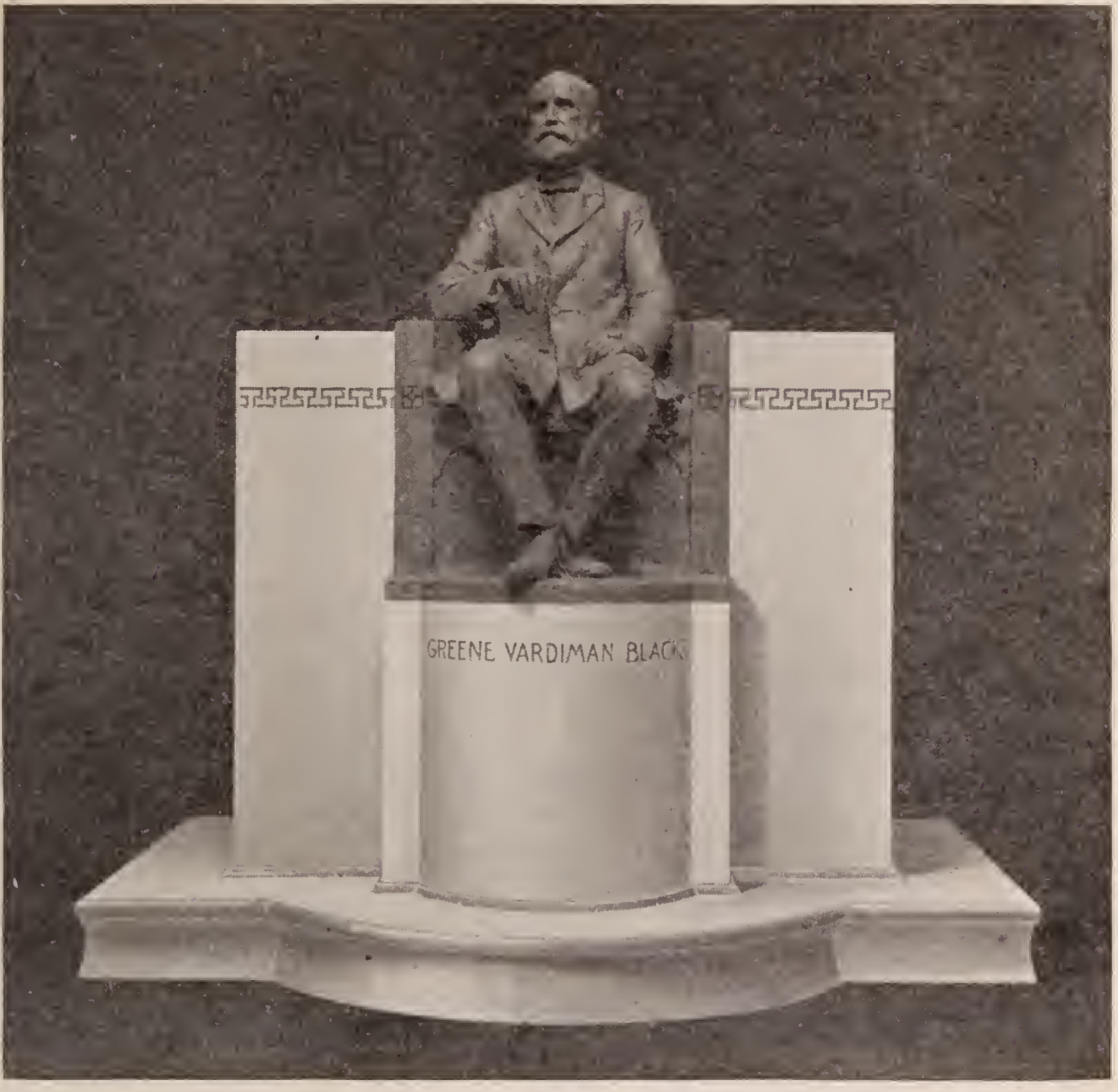
In addition to the offerings at the meetings a large number of dental manufacturers and dealers gave displays and clinics of general interest.

Dr. S. M. Weaver, of Cleveland, chairman of the Motor Dental Ambulance Co., had an equipped ambulance on exhibition in the park opposite the Congress hotel. It attracted much attention. Throughout the whole meeting a great patriotic feeling was expressed and many dentists were there in khaki.

It was altogether a splendid meeting but *oh, so hot.* The thought that seemed uppermost in the minds of everyone was, why do they hold the National meeting in the hottest season of the year?

We believe we are safe in saying that a great deal more benefit would have been obtained from the meeting had it been held in cooler weather. Let us hope that the date will be permanently changed, and if the trustees do not desire to take the responsibility, let them put the matter to a vote of members; they will soon decide it.

The next meeting at New Orleans will be in October and we hope that a great gathering will be there.



THE BLACK MEMORIAL AND THE BLACK HISTORICAL EXHIBIT

The dedication of the G. V. Black memorial took place on Thursday, Aug. 8th, at Lincoln Park, Chicago, Dr. C. N. Johnson, Chicago, presiding.

Dr. A. W. Thornton, Montreal, Can., gave an oration, "A Tribute to the Life Work of the Late Greene Vardiman Black."

Dr. T. W. Brophy, Chicago, made the presentation of the Black memorial to the Lincoln Park Board. Unveiling of the memorial was done by four granddaughters of G. V. Black. The memorial was then accepted on behalf of the Lincoln Park Board.

Dr. Thomas L. Gilmer, Chicago, spoke on "Reminiscence of Dr. Black."

On the occasion of the dedication of the monument to Dr. Black, it seemed appropriate to the officers of the National Dental Association that there should be exhibited some of the material things which would serve to remind the older and inspire the younger practitioners with the work of this great scientific investigator, writer and teacher, and Dr. Wm. Bebb was requested to prepare a Black Historical Exhibit.

There never has been shown at a dental meeting an historical collection of such magnitude and interest. It covered the entire period of Dr. Black's life from his entry into practice in 1858 up to the time of his death in 1915.

The exhibit consisted of a reproduction of Dr. Black's offices and the display of his original manuscripts, published articles and books, his scientific instruments and many personal items of interest.

The scientific instruments made a wonderful exhibition of the work of this man. Each instrument was designed for the purpose of working out some new problem and most of them were made by Dr. Black in his workshop.

The many diplomas and numerous gifts displayed conveyed to the mind something of the esteem in which Dr. Black was held by his professional brethren.

One of Dr. Black's manuscripts was entitled "How to Rest." From the great amount of work that he did one wonders if he ever rested, yet it was his custom to spend a month or six weeks of each summer in the woods or in travel. Some of his fishing tackle, photographs of the boat he designed and numerous outing photographs were shown to remind us that he was a good sportsman.

Dr. Black was a musician of ability, he played the piano, violin, piccolo, cello, flute and cornet. Three of his instruments, the violin cello and piccolo were on exhibition.

The display of Dr. Black's writings showed the stupendous work accomplished by this man. There were hundreds of manuscripts covering a period of fifty years. A view of the titles showed that Dr. Black had not confined his thought to dentistry alone. There were articles on Solitary Wasps, the Seventeen-Year Locusts, the Earth Worm, Tornadoes, Fossil Woods, Our Police System, the Use of Books, Typhoid Fever, Scarlet Fever, Bright's Disease, Mechanic Arts, Morality, the Microscope and Its Uses, the Theory of Sight, City Water Works, several Indian stories, many articles on chemical subjects, articles of travel, etc The exhibit was a most interesting one and Dr. Bebb deserves much credit for its preparation.

Leading Events in the Life of Dr. Black

Born near Winchester, Scott County, Illinois, August 3, 1836.

Family moved to farm seven miles southeast of Virginia, in Cass County, Illinois, in 1845.

Attended country school about three months each winter.

Studied medicine with Dr. Thomas G. Black, a brother, at Clayton, Illinois. 1853-1856.

Studied dentistry with Dr. J. C. Speer, Mt. Sterling, Illinois, 1857.

Practiced dentistry at Winchester, Illinois, 1858-1862.

Enlisted in 129th Illinois Volunteers, 1862.

In hospital at Louisville, Kentucky, six months, and discharged for disability, 1863.

Practiced dentistry in Jacksonville, Illinois, 1864-1897.

Joined Missouri State Dental Society, 1866.

Joined Illinois State Dental Society, 1868.

First important dental paper on "Gold Foil" read before Illinois State Dental Society, 1869.

President Illinois State Dental Society, 1870-1871.

Invented one of the first cord driven, foot power dental engines, 1870.

Lectured on pathology, histology and operative dentistry, Missouri Dental College, 1870-1880.

First president of the Illinois State Board of Dental Examiners, 1881-1887.

Wrote book, "The Formation of Poisons by Micro-organisms," 1884.

Professor of Dental Pathology, Chicago College of Dental Surgery, 1883-1889.

Introduced teaching of Dental Technics, Chicago College of Dental Surgery, 1887.

Wrote for the American System of Dentistry, chapters on "General Pathology," "Dental Caries," "Pathology of the Dental Pulp" and "Diseases of the Peridental Membrane," 1886.

Wrote book, "Periosteum and Peridental Membrane," 1887.

Voted life membership in Illinois State Dental Society, 1889.

Professor Dental Pathology and Bacteriology, Dental Department, University of Iowa, 1890-1891.

Wrote book, "Descriptive Anatomy of the Human Teeth," 1891.

Wrote series of articles entitled "The Management of Enamel Margins," Dental Cosmos, 1891.

Professor Dental Pathology and Bacteriology, Northwestern University Dental School, 1891-1897.

Chairman Section on Etiology, Pathology and Bacteriology, World's Columbian Dental Congress 1893.

Report on Dental Nomenclature, World's Columbian Dental Congress, 1893.

Wrote series of articles entitled "An Investigation of the Physical Characters of the Human Teeth in Relation to Their Diseases and to Practical Dental Operations, Together with the Physical Characters of Filling Materials," Dental Cosmos, 1895-1896.

Dean and Professor of Operative Dentistry, Dental Pathology and Bacteriology, Northwestern University Dental School, 1897-1915.

President, National School of Dental Technics, 1897.

President, National Dental Association, 1900.

Awarded First Fellowship Medal by the Dental Society of the State of New York, 1905.

Special Guest at Annual Meeting of American Dental Society of Europe, 1906.

Wrote Work on "Operative Dentistry," in two volumes 1908.

Testimonial Banquet by the Chicago-Odontographic Society, 1910.

Awarded Miller Prize for most distinguished services for the advancement of dentistry, by the International Committee, Paris, 1910.

Wrote book on "Special Dental Pathology," 1915.

Died on his farm fifteen miles northeast of Jacksonville, Illinois, August 31, 1915.

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.)

To Prevent Solder From Flowing

Any portions of a crown or bridge to which it is undesirable that solder should flow are coated with ordinary ink or a lead-pencil mark after heating the piece. The borax is subsequently applied, and the solder will be confined to the desired areas.—*J. A. Wright, Dental Review.*

A Good Separating Medium for Plaster Impressions

Having tried many of these, I have found none so quick and satisfactory as a solution of paraffin wax in petrol (gasoline). It is clean to handle, always ready, and the impression can be painted over and cast within a few minutes of being taken.—*H. J. Morris, Ash's Journal.*

To Avoid Air Bubbles in Plaster Casts

After coating impression with separating medium apply a moderately thin mix of plaster to the entire surface of impression with a ½-inch oval paint brush (not camel's hair). When coated, immediately immerse brush in a glass of water, and finish pouring cast in usual manner. This avoids jarring of impression with probable fracture or distortion. Allow brush to remain in water. When necessary to use it again the plaster will shake or jar out readily and brush is as clean as when new.—*Lester A. Roubert, Dental Review.*

Taking a Bite for Crown or Bridge Wor

One of the most difficult items in operative dentistry to contend with is the taking of a satisfactory bite, particularly where the occlusions are close. When the wax or compound bite is removed it often breaks in two pieces, making it difficult to obtain a perfect cast for the occluding surfaces to be articulated to the crown or bridge about to be constructed, or breaks when placed on the plaster model. Many ideas have been advanced for overcoming this, such as placing a piece of linen, cut about the length and width of the bite to be taken, then placing the wax above and below the piece of linen, taking the bite in the usual manner. The linen holds the bite together and prevents biting clear through.—*W. E. Beachley, Journal—Allied Dental Societies.*

Preparedness League of American Dentists

News and Notes

WORK DONE BY THE PREPAREDNESS LEAGUE TO JUNE 1ST, 1918

Men Examined	84,518
Men worked for and reported by card	63,625
Fillings Inserted	180,593
Teeth Extracted	67,247
Plates Made	630
Crowns Made	2,040
Crowns and Bridges	165
Bridges	885
Prophylaxis Treatments	33,671
Diseased Teeth Treated	3,165
Miscellaneous Operations	48,535
Total Operations Performed	336,931

The above report is taken from tabulated statistics made by Major W. A. Heckard.

COMMUNICATION FROM THE PRESIDENT

FREE DENTAL SERVICE

There are a few points about free dental service that should be emphasized at this time.

1. The League requests its members to give each drafted man *one hour* for free dental service. This should be given without question as to ability to pay.

When the hour has been completed, the dentist is at liberty to inquire as to the ability of the registrant to pay a fee to have the work completed, should additional service be required. Should he prove himself worthy of further free service, the dentist continues such service in the *name of the League.*

Such service only, is reported to the League.

2. All dental work for which a fee is received from the drafted man *is not Preparedness League work.*

Such service must not be reported to the League.

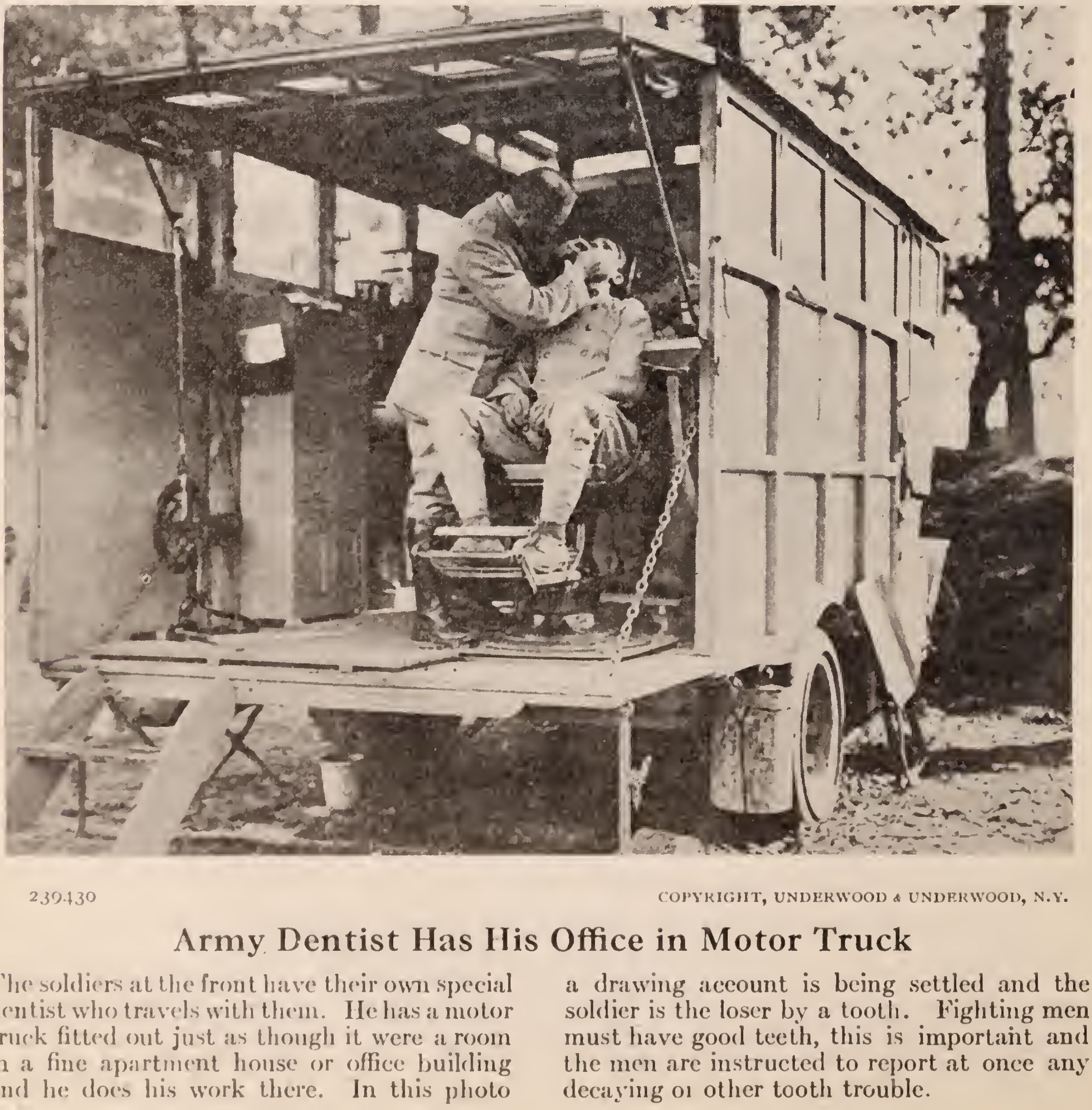
FREE is a word that cannot be qualified and admits of no variation. The charge of a single farthing nullifies the spirit of the League through which free dental service is given.

We have a million of our boys in France. How many of them are suffering from dental ills because you and I did not give them free dental service? Thousands are suffering today because you and I did not do our full duty by them. It is a serious matter and let us resolve to throw our best efforts into this great work which we alone can do.

Let us fight the enemy with our own weapons—those with which we are most familiar. As dentists, each one of us can do more to help win the war with the excavator, the engine and the forceps than we could by shouldering a gun and taking a place in the first line trenches.

Each one of us can do this in our own offices by giving free dental service to the drafted man. Give it freely and without restraint as one of the great privileges of an American citizen and let us all be thankful that we are able to do this through the heritage of the greatest birthright given by any nation.

President Wilson has shown us our duty when he said: "An army can win a battle, but it takes a nation to win a war."



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Army Dentist Has His Office in Motor Truck

The soldiers at the front have their own special dentist who travels with them. He has a motor truck fitted out just as though it were a room in a fine apartment house or office building and he does his work there. In this photo a drawing account is being settled and the soldier is the loser by a tooth. Fighting men must have good teeth, this is important and the men are instructed to report at once any decaying or other tooth trouble.

CORRESPONDENCE

PROCAIN AND NOVOCAIN IDENTICAL

To the Editor: It appears that in certain quarters the attitude is taken that the local anesthetic sold as Procain is not identical with that marketed as Novocain. The Subcommittee on Synthetic Drugs of the National Research Council believes it important that this misunderstanding should be corrected and hence offers the following explanation:

The monohydrochlorid of para-amino-benzoyl-diethyl-amina-ethanol, which was formerly made in Germany by the Farbwerke, vorm. Meister, Lucius and Bruening, Hoechst, A. M., and sold under the trade-marked name "Novocaine," is now manufactured in the United States. Under the provisions of the Trading with the Enemy Act, the Federal Trade Commission has taken over the patent that gave monopoly for the manufacture and sale of the local anesthetic to the German corporation, and has issued licenses to American concerns for the manufacture of the product. This license makes it a condition that the product first introduced under the proprietary name "Novocaine" shall be called Procaine, and that it shall in every way be made the same as the article formerly obtained from Germany. To insure this identity with the German novocain, the Federal Trade Commission has submitted the product of each firm licensed to the A. M. A. Chemical Laboratory to establish its chemical identity and purity, and to the Cornell pharmacologist Dr. R. A. Hatcher, to determine that it was not unduly toxic. * * *

In conclusion: Procain is identical with the substance first introduced as Novocain. In the interest of rational nomenclature, the first term should be used in prescriptions and scientific contributions.

Julius Stieglitz, Chicago.
Chairman, Subcommittee on Synthetic Drugs, National Research Council.

Northeastern Dental Association

The Twenty-fourth Annual Meeting of the Northeastern Rhode Island Dental Association will be held at the Narragansett Hotel, Providence, R. I., on October 10th, 11th, 12th, 1918.

Alvin A. Hunt, *Secretary.*

OBITUARY

DR. JESSE W. STAGE

DR. JESSE W. SAGE

DR. JESSE W. STAGE, who died July 11, 1918, as announced in our August number, had struggled against complications of ailments for many months, resulting from a general nervous breakdown. He had practiced in Goshen for nineteen years, going there a short time after receiving his degree from the Indiana Dental school at Indianapolis.

Dr. Stage was 47 years old. His parents, Stanford S. and Cordelia A. Stage, were pioneer Lagrange-county residents. During his boyhood he worked on his parents' farm in the summer and gained his education by attending the district school during the winter term. After completing his schooling at the Wawaka, Noble county, High school he began teaching at the age of 19 years. During the summer months he attended Valparaiso university, taking special training in scientific work. For two years he was instructor and student. He spent the year of 1894 as an instructor at Wawaka, later becoming a member of the Ligonier city school faculty. Entering Indiana Dental College in 1896, he made strenuous efforts to head his class and his cherished ambition was nearly realized. The degree of D. D. S. was conferred upon him in April, 1899.

For several months the deceased had been in failing health, but only during the last few weeks had his condition been considered precarious His death had been expected for several days by members of his family.

He is survived by his wife, Clara, one daughter, Eloise, and a son, Stanley.

Dr. Stage was a member of the Knights of Pythias.

In connection with the death of Dr. J. W. Stage of Goshen, I wish to submit the following as a statement of his activities in the Indiana State Dental Association. Dr. Stage joined the Indiana State Dental Association in 1901 and he died at Goshen, Indiana, on July 12, 1918. During his membership in the State Association he was a very active member; he had contributed to papers, discussions and clinics, to the programs of Annual Meetings at different times, and he also served several years ago very efficiently as a member of a Committee on revising the Constitution and By-Laws. At the Annual Meeting of the State Association last May, a telegram of sympathy and encouragement was sent to Dr. Stage from the members in general session assembled.

Fraternally yours,
A. R. ROSS, Secretary.

DENTAL ITEMS OF INTEREST

The parodies achieved on poor Tom Hood's "Song of the Shirt" have been many. The latest has been sent to us by Mr. Walter Rose, L.D.S., of Sligo, who sings "The Song of the Pulp." It is too long for full reproduction, but a few stanzas show that Mr. Rose is not without a considerable sense of the humorous.

With fingers weary and stiff,
With patience worthy of Job,
A dentist stood at a twisted slant
Plying his bristle and probe.
Unheeding the patient's gasp
Or saliva-absorbing gulp,
He gripped his mirror with firmer grasp
As he sang this "Song of the Pulp."

"Probe, probe, probe,
Till I'm feeling ready to swoon;
Probe, probe, probe,
And collapse in my own spittoon;
Oh it's weary work to search
For a root-canal orifice small,
Perhaps to find at the end of my grind
That I've punctured the distal wall."

"With reamer, bristle and probe
I pursue the elusive nerve
And try to approach with my finest broach
The end of that beastly curve.
Drill and reamer and broach,
Broach and reamer and drill,
Far wiser it were that I should swear
That the tooth is too bad to fill." Dental Record.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

Announcement

With pleasure we announce to the dental profession and the trade, that we have acquired and taken over the business and stock of the Detroit branch of The Consolidated Dental Manufacturing Co., 801-13 David Whitney Building. as of this date, and that the business hereafter will be conducted as a branch of this company. Mr. William H. Mills remains in charge as heretofore.

As promptly as circumstances permit, the Detroit stock will be adjusted to meet every requirement of modern practice, while convenient location and unusual shipping facilities make prompt additions feasible at all times.

With more diversified stocks and improved facilities, we confidently ask for a continuance of the business favor shown our predecessor, and hope to merit a large increase.

LACONIGRAMS

In our August issue we were led by misinformation to do an unintentional injustice to one of our best friends in stating that Mrs. Eva Shapiro was the first woman dentist in Toledo. Dr. Della Adams Gundrum, an ethical dentist in excellent standing, has been in continuous practice here since 1894. This correction is most cheerfully made.

A man supposed to be a Mr. Friedman was ejected from the exhibition floor of the National dental meeting at Chicago for selling and delivering goods bearing the ostracised trade-mark, "Made in Germany," it is alleged. It seems hardly possible that anyone could have the "nerve" to attempt such things. It is a sufficient violation of the rulings of such bodies to sell and deliver any kind of goods on the floor to justify the action of the authorities, but "Made in Germany!" Bah!

Medical and dental examinations are now compulsory in the province of Ontario, Can. Why allow our northern neighbor to excel us? Get busy.

The Cleveland dental ambulance continues to excite favorable comment wherever seen.

A service flag bearing 6,000 stars was unfurled during the National meeting, in honor of the members of the profession now in the service. More than a half-million operations already have been performed by the 20,000 dentists enrolled in the Preparedness League. Have you done your share?

At the meeting of the National Association of Dental Examiners held at Chicago, August 5, a resolution was unanimously adopted pledging the delegates to "sever all relations, commercial and otherwise, with that country which has forfeited the confidence and respect of every civilized nation on earth." The resolution was presented by Dr. W. F. Walz, Covington, Ky. And once more I'm proud to have been born "in old Kaintuck."

Attendance at the National meeting is estimated at 6,000.

Edward Maynard, born 105 years ago at Madison, N. J., is believed to have been the first dentist in modern times to fill a tooth with gold. I say "modern," because there now is plenty of evidence that prehistoric dentists employed that material with as much skill and apparent success as the best men of today. Dr. Maynard was the inventor of many of the instruments still used in practice, not, possibly, in the precise original form, but built around the same idea, to accomplish the same purpose. He also was the inventor of the breech-loading Maynard rifle, in 1851. Dr. Maynard died in Washington in 1891.

Standards of scholarship in dental colleges are to be still further advanced, according to reports from the National meeting. Only students of a high standing will be allowed to continue their studies without interference from draft.

Rhode Island dentists have reduced camp rejections on account of bad teeth to the irreducible zero, according to reports from the National Council of Defense. Dentists of that state claim to lead those of all others in the Union.

Dentists are now making new chins and even complete maxilla for wounded soldiers so perfect that they defy detection even upon close examination. Here is a work worthy of the best efforts of the best men.

Dr. Arthur N. Davis, until recently dentist to his satanic majesty, is writing his reminiscences for the public press. Every dentist should read every installment. These articles throw much light upon the peculiar degeneracy of the kaiser.

When the story is written of the professional work done to help win the war, that of the dentists will stand out among the best and brightest. Nowhere has there been the slightest hesitation to take on the burden of added work without compensation, and nothing that has been done has added more to the effectiveness of American forces overseas. The dental profession has earned the right to be proud of its patriotism.

Dr. F. W. Bishoff, formerly a dentist of Bayonne, N. J., is being held under $20,000 bail on the charge of conspiracy to blow up a munitions plant at Newark, that state. The accused is said to be an expert chemist. He is said to have paid a fine of $500, not long ago, at Elizabeth, for practicing without the necessary legal qualifications.

German prisoners say that the people of the central powers cannot understand why they are hated by the rest of the world. And this is another proof of the opacity and callousness of the nature that all civilized nations are straininig every nerve to put out of business.

Hun newspapers declare it to be "scandalous" that the few American dentists still in Germany are enjoying the very cream of the practice among "society" people, who "seem to delight to pay steep prices for service bills for which are rendered in hateful English." There seem to be some discriminating people even in Germany.

Dr. C. C. Schwartzbeck, of Bryan, Ohio, has been appointed dental examiner on the draft board.

The South-Central Dental Society was organized at Bedford, Ind., July 25, including Brown, Bartholomew, Jackson, Lawrence and Monroe counties, with J. H. L. Strain, Bloomington, president; J. G. Hogan, Bedford, vice-president; J. H. Gambrell, Mitchell, secretary; J. F. Shaddock, Columbus, treasurer, and Fred J. Prow, Bloomington, member state board of trustees.

That dentists of the Preparedness League are doing their bit in a man-size way is evidenced by the statement that they are giving in time and material fully 12 per cent. of their incomes. It may well be doubted that any other class is doing more, if as much. And it is all voluntary, and in addition to taxes, direct and indirect.

The New Jersey state society has added morality to its requirements for membership. A very good idea, provided too rigorously conventional ideas of morality are not held by the censor.

The robbery of dental offices as a "preferred industry," seems to be going out of fashion. Only a few, in Tiffin, Findlay and Mansfield, Ohio, and St. Louis found their way into public print last month, the total amounting to less than $300.

Deaths.

At LaCrosse, Wis., August 1, Dr. George F. Hauser was found dead in bed. He was only 45. He was the discoverer of a method of transplanting teeth now in use in war hospitals.

At Chicago, July 31, Dr. Charles Daniel Lund, aged 54.

At Brooklyn, N. Y., August 2, Dr. Lorin Gurley Clark, aged 66. Dr. Clark was a native of Ravenna, Ohio, a graduate of Berea and of Paris, and had practiced in Brooklyn since 1882, except for a period of nine years when he was preceptor at Illinois Dental College, Chicago.

At Bordentown, N. J., July 20, Dr. William H. I. Hilliard, aged 77.

At Ottumwa, Iowa, July 24, Dr. L. A. Osborne lost his life by drowning while trying in vain to rescue a drowning boy who had been taken with cramps while swimming. A minister who attempted to aid both also lost his life.

Prize Winning W. S. S. Salesman.

Columbus, Ohio.— (Special)— Announcement is made by the Ohio War Savings Committee that William C. Kyle, rural carrier operating out of the Cadiz (Harrison county) postoffice, is winner of the contest conducted between May 20 and July 20 for rural mail carriers of the state. As winner, Mr. Kyle will receive as a prize the $2,000 daughter of King Champion, Rag Apple Sadie.

At the convention August 23, in Columbus of Ohio rural carriers, Mr. Kyle will be publicly presented with the champion heifer— Rag Apple Sadie. It has been donated to the Ohio War Savings Committee by A. W. Green, proprietor of Walnut Crest Farms, Middlefield.

Sales credited to Carrier Kyle between May 20 and July 20, reached a total of $29,633.

Other "high" rural carriers, W. S. S. salesmen in the prize contests were: Ben F. Robbins, Wellston, $28.828; Albert V. Horn, Plain City, $24.329; Charles L. Houghton, Felicity, $18.965; William B. Riley, Bealsville, $9.792; J. L. Maier, Eagleport, $9,375; John R. Hart, Lebanon, $9,117.

New Jersey dentists are goinig to do their best to eliminate the alleged evil of the "chain" dental office, by making it illegal for any man to operate an office under his name other than the one in which he personally practices. Such action would certainly have the tendency to eliminate the "get-rich-quick Wallingfords," in the profession. Few men ever accumulate fortunes except by profiting by the work of other men.

Dentists at Camp Custer, Battle Creek, Mich., have operated on 21,000 patients since the opening of the camp, an average of over 3,500 a month. The government pays for alloy fillings. The soldier may have gold if he prefers by paying for the material. The government also pays for necessary plates, but crowns and bridges must be paid for by the soldier requiring them, at actual cost.

Cleveland Hospital Clinic.

The dental clinic conducted by the Cleveland Mouth Hygiene Association at the Cleveland City Hospital has an enviable record to show for the first six months of its existence. At this clinic the patients of the hospital in need of dental services are taken care of and there are over 1,000 beds that are always well filled. Then the daily dispensary clinics of the hospital also bring many more.

In addition to these, this clinic cares for all the patients of the various free dental dispensaries and orphanages in Cleveland who require dental surgical interference. This embraces such work as extraction of teeth, repair of fractures, and the like for which the use of general anesthetics are required. Patients for this branch of service range in age from two years to 70 years old.

The society employes a dentist who gives his full time to the clinic. Dr. H. C. Kenyon, a member of the society, is the director and personally cares for those requiring the dental surgical treatment. Friday afternoon of each week is given over to this branch and the crowds that turn up of all colors, ages and types would interest anyone, be he professional or layman.

The facilities for handling this is greatly enhanced by the opportunity the clinic has of obtaining the services of Dr. M. J. Cramer, the visiting anesthetist to the department of surgery of the City hospital. Dr. Cramer, who is himself a dentist, renders very valuable service and already over 800 general anesthetics have been given for this clinic which include the use of nitrous oxid ogygen, ether and ethyl chlorid.

Dr. Linsley Captures Thief.

Dr. J. H. Linsley, Ashtabula, Ohio, at about 6:30 on the morning of July 30, knocked down and captured a burglar who had robbed his dental offices.

Dr. Linsley had occasion to go to his office early and was accompanied by his brother. He noticed that the door to his outer office was open and suspected that he had been robbed. Entering his inner office, he saw the burglar leaving and gave chase.

The burglar cleared the stairs to the street below in about two jumps, but the dentist was hot on his trail. He started for an alley, and there Linsley overtook him.

In police court the burglar gave his name as Harry George, age 55. He pleaded not guilty, waived examination, and was bound over to the grand jury in the sum of $1,000. He was committed to jail.

When searched George had considerable plunder which he had stolen from the dental office, including gold scrap, plates, etc. He also carried a set of burglar tools.

The Great U-Boat Fiasco.

The absolute failure of the U-boats to molest the hundreds of American transports which have crossed and recrossed time after time in the last twelve months will be quite inexplicable to the deluded Huns. In their eyes a German submarine is invincible and ubiquitous, and it is certain that the composure with which they heard the American declaration of war was due to a fixed belief that the U-boats would effectually prevent any American military aid from reaching the allies. Little more than a year ago Admiral von Capelle gave an unqualified pledge on this point. "We are not frightened of America's much-talked-of million Army," he airily declared. It is out of the question that our men in the trenches will ever have to face them. The United States may raise as many troops as it likes, but it can not bring them over here. Our submarines will see to that." How fatuous those words sound today, when a million and a quarter American fighting men, the cream of their race, already stand on European soil! In a desperate effort to stem the tide of invasion, von Capelle sent a couple of U-boats to American waters some weeks ago, hoping to scare the transports back into harbor. What was the result? During May and June a total of 520,000 troops was dispatched to Europe. No doubt the discredited U-boats will continue their futile efforts to interfere with the great movement, but we know now beyond all doubt that German submarines are powerless against the splendid system of convoy furnished by the American and British Navies.

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Whenever and wherever assayed, Williams Mat Gold will prove to be "1000" fine---that means 100% pure gold, which ensures maximum cohesiveness and ductility.

This is why Williams Mat Gold can be worked with time-saving ease; can be used in large pieces; welds itself piece to piece; producing a filling of maximum density. It is the reason for the perfect color, and its selection by 90% of the world's dentists for its easy-working qualities, stability and adaptability.

There is a noticeable trend back again to mat gold and we attribute this to the superiority of a Williams Mat Gold Filling over a substitute. Some dentists have found themselves face to face with the question; "Where have my profits gone?", or "Where have my patients gone?", after replacing a substitute filling several times. Williams Mat Gold Filling is good for ten to twenty years.

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Full value (less a very small refining charge) paid for scrap gold, sweepings, platinum, amalgam and other precious metals. Returns made promptly by check or any of our full line of high-grade dental golds.

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Saving and Serving.

By economizing in consumption and with the resultant saving, purchasing the Government's war securities the American citizen performs a double duty. The citizen and the Government can not use the same labor and material; if the citizen uses it, the material and the labor can not be used by the Government. If the citizen economizes in consumption, so much material and labor and transportation space is left free for Government uses. And when the saving effected is lent to the Government more money is thus placed at the disposal of the Government.

The more the people save the more money, labor, and materials are left for the winning of the war, the greater and more complete the support given to our fighting men.

To achieve victory we must have two armies: One that fights; one that saves. Every patriot will be a member of one of these armies.

If your neighbor offers his life, surely you can loan your money. Save with the same eagerness that your neighbor fights, and buy W. S. S. with your savings.

Marshall Field, some years ago, said: "Careful saving and careful spending invariably promote success. Economy is one of the most essential elements of success, yet most wretchedly disregarded. The 5 or 10 cents squandered a day, if saved, will in a few years amount to thousands of dollars. If a man is not competent to manage a small income or a small business, he is not competent to manage a large income or a large business."

Do not forget that the supply of labor and material is limited. If you ask a worker to make something for you, he can not make something for the Government at the same time, and he can not use the same material both for your needs and for the Government's needs.

Every time a German submarine sinks a ship, so much product of labor and materials is wasted. Every time you buy anything not needed, so much product of labor and materials is wasted.

Formalin is used exclusively in the Girard College infirmary for treating abscesses, with complete and uniform success. Read the article by Dr. (get from article) in this issue. This would seem to indicate that the cry against formalin preparations is animated solely by misunderstanding, prejudice or ignorance.

Dr. W. I. Jones, of Columbus, Ohio, has been commissioned a Captain in a Red Cross unit and has gone to France in the capacity of an oral surgeon and anesthetist. Dr. Jones' brother will look after his practice during his absence.

High Production of Arms and Munitions.

The attention of owners of Liberty Bonds and War Savings Stamps is called to the following. They are financing the work:

One day in June last, approximately 27,000,000 cartridges of various descriptions were produced in the United States manufacturing plants for the United States Government.

The daily average production of United States Army rifles was broken in the week ending June 29, an average of 10,142 rifles a day of a modified Enfield and Springfield type being maintained. In addition spare parts equivalent to several thousand rifles and several thousand Russian rifles were manufactured.

The Ordnance Department has produced 2.014,815,584 cartridges, 1,886,769 rifles, and 82,540 machine guns since the United States entered the war. The daily output of cartridges is now 15,000,000.

The dealer who is using wheat flour paste in his paper hanging department fails as flagrantly in his patriotic duty as the man who deliberately wastes wheat products at his dining table. A potato flour paste, reports the Food Administration, has been found as effective for paper hanging in some quarters.

X RAY

A complete course of private instruction in DENTAL ROENTGENOLOGY is offered. Special attention to technic. Address

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In the treatment of suppurative lesions of the gums, wherein stimulating restorative antiseptic influence is indicated, prescribe

LISTERINE

For cleansing and purifying the oral cavity before and after operations on the teeth, a cooling, refreshing spray, wash or gargle is provided by

LISTERINE

As an adjunct to the dental toilet of your patients; as a prophylactic tooth and mouth wash, for daily use, there is nothing superior to

LISTERINE

Booklet "The Teeth and Their Care" emphasizes the importance of frequent consultation with the dentist, and contains useful information for patients; 200 copies, imprinted with professional card, furnished gratuitously.

Dental examination blank combining chart and Notice to Parents, suitable for dentists doing clinical work among school children, also supplied without cost. Dentist's name and address printed thereon.

LAMBERT PHARMACAL COMPANY

Twenty-first and Locust Streets St. Louis, Mo., U.S.A.

C. M. CARR PATENT VOID

United States Court Decrees Patent on Pyorrhea Tools Invalid

Dentists everywhere will be interested in learning that certain litigation of great importance to the profession has just terminated. The result is a complete victory for the Dental Protective Association of the United States, which, in carrying out the objects of its charter, successfully assumed the defense of a case brought against one of its members.

The Carr School of Preventive Dentistry and Medicine assignee of Cassius M. Carr, brought suit against Dr. Austin F. James, of Chicago, in the U. S. District Court for the Northern District of Illinois, Eastern Division, for alleged infringement of the Carr patent on Pyorrhea tools and for unfair competition in trade. On Tuesday, July 2, 1918, His Honor, Judge George A. Carpenter, entered a final decree adjudging as invalid, void, and of no effect in law those Letters Patent known as No. 1,138,355, issued May 4 1915 to Cassius M. Carr, on Dental Tools, and which the patentee purports to exemplify in a set of one hundred fifty tools, well known as the Carr Pyorrhea set. The suit was ordered dismissed for want of equity at the plaintiff's costs.

The importance of the case arises from the establishment of the right of all dentists to avail themselves of instruments of the type described in the patent, in larger or smaller sets, without paying patent tribute to anyone. The Dental Protective Association of the United States conceived that the patent sued on was not a good patent in law, and that its existence could be made, and was likely to be made, the basis of serious oppression to dentists, especially in view of the numerous suits already brought under it. The suit against Dr. James was one which the Association considered to be of that character. The Dental Protective Association has consistently fought to protect its members from unjust and unlawful patent claims, and makes no distinction in this respect between patents for mechanical devises and patents for processes or methods. While its chief obligation is to its members, such results as come from its success in the present case will inure to the benefit of the profession as a whole.

A vast amount of testimony was taken by both parties to the suit, the plaintiff having thirty-six witnesses and the defendant twenty-five. For the defendant a large number of the most prominent teachers and practitioners on the subject of Pyorrhea gave valuable testimony.

The defeat of the Carr patent ought to relieve many dentists from the annoyance of litigation which Carr or the Carr School has threatened to institute. The air is cleared and dentists now are justified in treating the patent as though it did not exist.

In passing it may be mentioned that a suit brought by Carr against Dr. Thomas B. Hartsell of Minneapolis, on the same patent, was defended by the Dental Protective Association, and was also dismissed at Carr's costs.

The Association's attorneys are Mr. Percy B. Eckhart of Chicago general counsel, and Mr. Luther B. Johns, of Chicago, patent counsel. We express our appreciation of their very thorough preparation of the case and its successful defense.

(Signed) DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES.

By J. G. Reid
D. M. Gallie } Directors.
J. P. Buckley

A NEW RUSSIAN HUMORIST.

I can recommend "Nine Humorous Tales" by the Russian writer, Anton Chekhab (Stratford Co., Pub., Boston), to the American readers who enjoy comparing the product of humorous writers of other nationalities with our own.

If, as we frequently are told, the art of a nation is an expression of national character, the same is true of the humor of a nation as revealed by its best known writers. In the preface—"An Impression"—to the "Tales" it is intimated that the humor of Anton Chekhab is like to that of our own O'Henry of beloved memory. To our way of thinking the humor of O'Henry is more wholesomely stimulative than is that of Chekhab though lacking, possibly, in the subtle philosophy underlying the humor of the latter, which, after all, is the humor of Realism stripped naked of all make-believe. For example in one of the "Tales," "Her Gentleman Friend," Finkel, the dentist, and the erstwhile G. F., is portrayed as repulsive in the extreme. Here we glimpse Chekhab the psychologist; for with fidelity we are given the word-picture of Finkel as a gross debauche, his coarse, repulsive exterior indicative of the real man. Chekhab is too much the artist to paint Finkel as an irresistible Don Juan; for a man who could lasciviously revel in having a woman of the underworld "pour beer over his pate" would necessarily be not only stupid but "commonplace and repulsive."

At the close of the story there is a distinctively human touch of pathos in the inevitable going back of the woman, which, by the way, is reminiscent of the heroine of a modern American play, "The Easiest Way." There is, too, a touch of sly humor where Finkel. the dentist, insists upon his fee—the one who came to borrow gives up her last rouble—Finkel failing to recognize the woman as a former "chere amie."

Moral—"No sentiment during business hours" might be a good slogan for—well, let us say, dentists.

In "A Work of Art" Chekhab handles his subject somewhat audaciously but the point of the story is clear; its philosophy, though homely, sound.

A valuable lesson is hidden in most of the "Tales." "The Scandal Monger" gives us a vivid picture of one who "doth protest too much," thereby sinking deeper and deeper into a net of his own weaving. Incidentally, "The Scandal Monger" is a good fish story.

"That Fresh Kid" might be the story of any American girl with the irrepressible "enfant terrible," the ubiquitous younger brother with an almost preternaturally precocious business instinct.

In more serious vein is "Fame," the best written of the series. Fame is faithfully portrayed as the elusive jade she really is. In this story, as in "Who Was She?" Chekhab slyly manages to reveal to us that men and women are interesting because of their human relationships rather than for their accomplishments in the realm of science, art, etc.; the absence of "ring and book" lending piquancy to what, ordinarily, might become commonplace though, possibly, safe. In this connection Chekhab's philosophy is that safety and commonplaceness are synonymous terms.

In "Fame" there is a subtler a more refined, humor than in the other tales. In the final analysis, though, we accept the fact that Chekhab's humor is not refined, according to conventional standards; at the same time we recognize him as being deeply human in, as suggested in the preface, his kindly, satirical recognition of the truth of Puck's conclusion: "La! what fools (we) mortals be." M. C. F.

Aug. 23, 1918.

Army Dental Corps News.

1st Lieut. Frederick W. Herms to Rockford, Ill., Camp Grant, for duty.

Appointment of following as first lieutenants in dental corps, Regular Army, announced: Capt. Charles J. Denholm and Lieut. Harry Holmes, dental reserve corps; Elmer H. Nicklies, Harold Jensen and Edward W. Blurock, Lieut. Daniel Sumner Lockwood, dental reserve corps; Lieut. Thomas W. Deyton, dental corps, National Army; 1st Lieut. James B. Mann, dental corps, National Army; Lieuts. Avery S. Hills, George M. Babbitt and Judge W. Fowler, dental reserve corps; Francis S. Adams; Private Archie T. McGuinness, medical department; Carl H. West and Edwin M. Kennedy; Capt. Merle W. Catterlin, Lieut. Thomas M. Page, Capt. Clarence P. Jackson and Lieut. Chester B. Parkinson, dental reserve corps; 1st Lieut. Herbert E. Guthrie, dental corps, National Army; Capt. James H. Keith, dental reserve corps.

The following of dental corps recently appointed from dental corps, National Guard, assigned to duty at places specified: 1st Lieut. Herbert E. Guthrie, Camp Shelby, Miss., and 1st Lieut. James B. Mann, medical officers' training camp, Fort Oglethorpe, Ga.

Dental Reserve Corps.

Maj. John Vose to Des Moines, Iowa, Camp Dodge, for duty with base hospital 88.

Appointment of following in dental reserve corps announced: To be Majors: 1st Lieut. Samuel W. Hussey, dental reserve corps, and Capt, Albert J. T. Beatty, dental reserve corps. To be Captains—1st Lieuts. George H. Elliott, Floyd De W. Leach, George W. Middleton, George E. Roland, Benjamin B. Todd, Roy E. Barr, Harry T. Bledsoe, Martin M. Block, Harry E. Cunningham, Walter P. Christiansen, Joseph H. Hurdle, Lawrence H. Jacob, Louis A. Landy, Wm. C. Melvin, Wm. W. Oursler, Robert W. Parrish, Jay C. Thuma, Melford S. Sorley, Charles L. Appleby, Troy L. Babcock, Herman A. Barkman, Arch G. Fee, Wm. F. Murphy, George J. Stephens, Jonas T. Williams, Jr., and Orrin K. Weaver, dental reserve corps.

Get this idea into your mind: Militarism must die, the kaiser must be dethroned and held in safe keeping, and the entire polity of German made over if the world is to become a decent place in which to live. Nothing less and nothing else will answer. No compromise; no sentimentality for the "poor, deluded German people," possibly can get us anywhere. Once defeated and on her knees, there may be some play for leniency; but only stern measures possibly can avail against a nation that recognizes no right except might. no divinity except force.

Classified Advertisements under this heading, $2.00 each for 60 words or less; additional space, 2 cents per word, single insertion; three insertions or more, special rate on application.

FOR SALE—$5000 dental practice with up-to-date equipment. Beautiful Ohio city, 20,000. New building, modern conveniences, fine location. Clientele drawn from best people in city and surrounding farming district. A snap for man who means business and wishes to make money from the start. Must leave on account of climate. Price reasonable. Address, 910P, care The Dental Summary.

REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XXXVIII October, 1918 No. 10

TO WHAT EXTENT CAN TOOTH STRUCTURES BE STERILIZED IMMEDIATELY WITH DILUTE SOLUTIONS OF FORMALIN*

BY SAMUEL P. CAMERON, D.D.S., PHILADELPHIA, PA.
DENTIST-IN-CHIEF OF GIRARD COLLEGE

I AM PLEASED to have the pleasure of addressing you this morning upon the subject, "To What Extent Can Tooth Structures Be Immediately Sterilized with Dilute Solutions of Formalin." It was in 1899 that I first became associated with Dr. James P. Nichol, now of 1516 Locust street, Philadelphia, who was then in charge of the Pennsylvania House of Refuge, giving what dental services he could one day a week to seven hundred boys between the ages of six and eighteen years. We were particularly confronted with the enormous loss of the first permanent molars, especially those in which the pulp had become infected by decay, and the tooth had to be extracted, as the method in use at that time consumed so much time that it was impossible to get results without making several appointments, which was impracticable with so many boys to be cared for. The first experiment

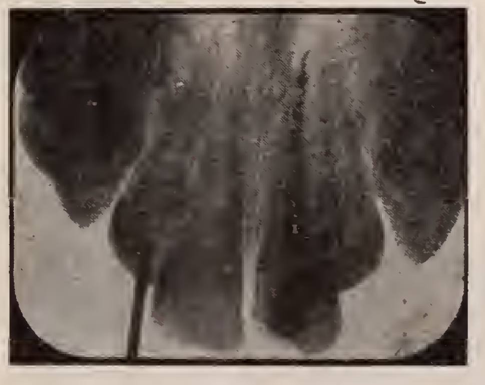

Fig. 1

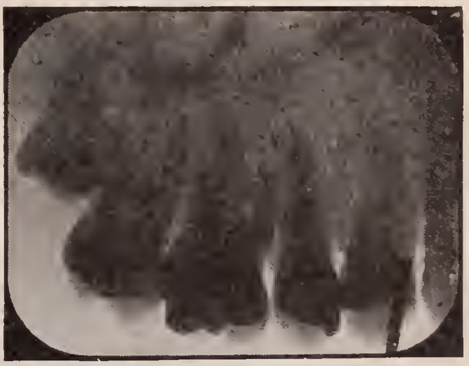

Fig. 2

Fig. 1—The superior, right, central incisor was found to be putrescent on July 2nd, 1917. It was treated with formalin and dressed. The canal was filled on July 10th, one week later.
Fig. 2—The superior, left, second bicuspid was putrescent on August 15th, 1917. Treated with formalin and canal filled.

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*An address before the Ohio State Dental Society, Dec., 1917.

with formalin was with a 40% solution and showed most gratifying results. Many boys returned after having had a putrescent tooth treated and the roots filled at one sitting reporting that the tooth had been entirely comfortable. Occasionally, we would find a case which would develop a peridental inflammation, which was more or less severe, so we decided to test the value of the formalin treatment further by using the same technic with a 20% solution. The results of this were more gratifying, as fewer cases of soreness were reported and almost no cases of severe peridental inflammation. In the further study of the use of formalin, we found that the most ideal results were obtained by using 4% and 2% solutions.

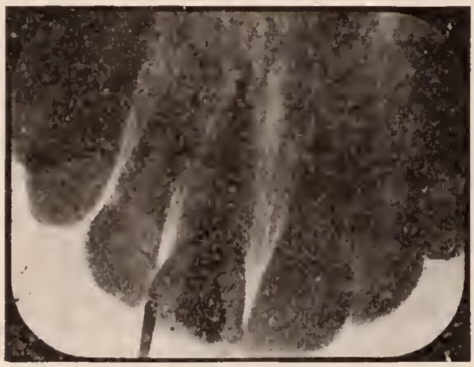

Fig. 3

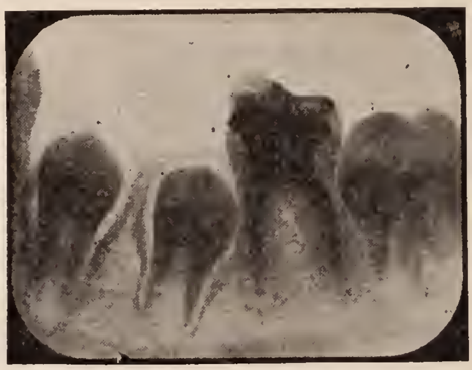

Fig. 4

Fig. 3—The superior, left central incisor—putrescent. Treated with formalin and dressed canals. Canal filled October 2nd, 1917.

Fig. 4—The inferior, right, first permanent molar was putrescent on April 18th, 1916. The boy was then only 10 years of age. It was treated with formalin and the canals dressed several times before filling. Radiographed over one year after filling roots.

When the Dental Department of Girard College was formally opened in September, 1911, the enormous task of caring for and establishing a healthy condition, as soon as possible, in the mouths of approximately 1,500 boys clearly necessitated prompt, positive and rational methods. The method of treating putrescent teeth in the Dental Department of Girard College today is to open these teeth carefully,

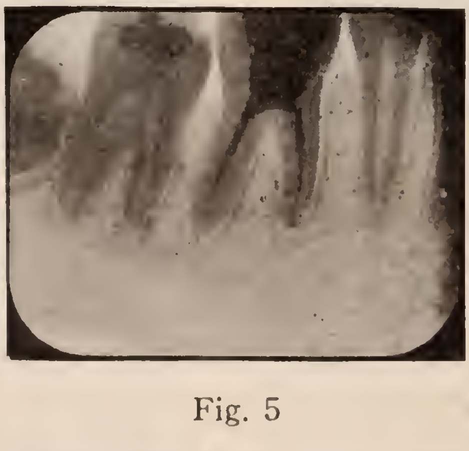

Fig. 5

Fig. 5—The inferior, left, first permanent molar was found to be putrescent on March 15th, 1916. The tooth was treated with formalin and the canals filled.

applying 4% formalin, and by frequent applications of heated air, the formaldehyd gas is liberated, which joins the irritating gases and poisonous liquids, rendering them innocuous. By several applications of this kind and by removing the decomposed tissue as it is sterilized until near the end of the root, and then by modifying the strength of the drug to 2%, the entire tooth is brought into an aseptic condition chemically. At the same time, by the use of drills and broaches, the root canals are enlarged and all septic material removed from the mouths of the tubuli communicating with the root canals. If the technic of this operation has been carefully and thoroughly adhered to, the tooth can be filled at once. By this method, in almost all cases, we can fill such a tooth at one sitting, saving a great many subsequent appointments. We feel, however, that it is conservative to seal a treatment of creosote in the canals for about seven days before filling.

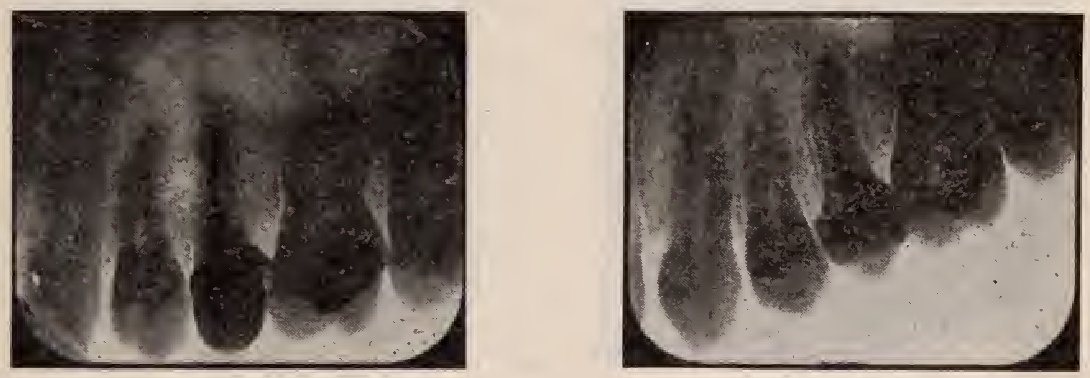

Fig. 6

Fig. 6—The superior, right, second bicuspid. Putrescent November 22nd 1915. Treated with formalin and canals filled one week later. Radiographs made January 9th, 1917, and November 28th, 1917.

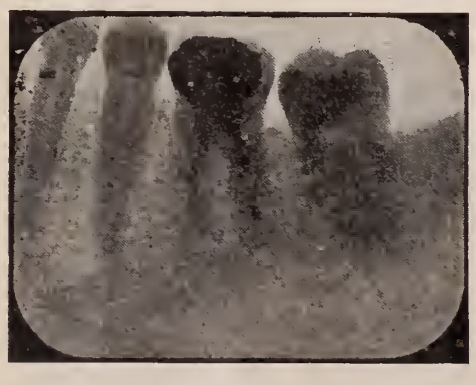

Fig. 7

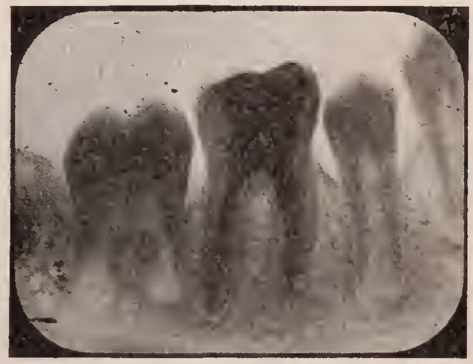

Fig. 8

Fig. 7—The inferior, right, first permanent molar was putrescent on March 31st, 1915. Formalin treatment. Filled roots two weeks later.

Fig. 8—The inferior, left, first permanent molar was found to be putrescent on November 10th, 1915. The boy was then 8½ years old. The tooth was treated with formalin and the canals filled.

It must be borne in mind, however, that in the use of formalin the greatest care must always be observed and that it should not be applied in the root except on a broach with a very small amount of cotton just moistened with the drug, and the treatment only carried to a point where an odor of formaldehyd gas is given off, due to the liberation of the gas when heat is applied.

On first consideration and by some very good authorities on the subject, this method is pronounced somewhat radical; but, after nineteen years' experience, including the experience of the past six years in which more putrescent teeth have been treated in this department than would come into a single practice in a lifetime, I do not hesitate to declare this method both rational and conservative. The work done in Girard College during this period should be convincing, as, of 314 putrescent teeth treated in the past six years, only one gave trouble and required medical treatment. An alveolar abscess followed the treatment of a putrescent tooth. In this case, the technic of the operation was not thoroughly adhered to.

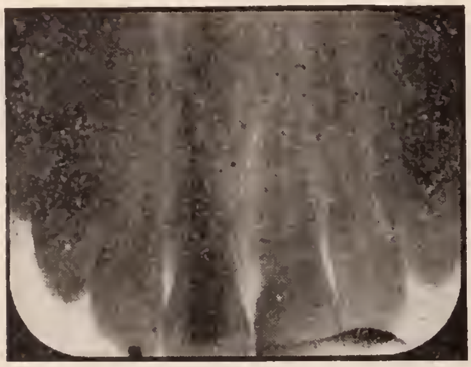

Fig. 9

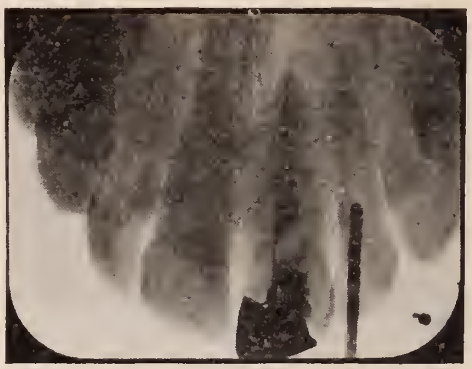

Fig. 10

Fig. 9—The superior, left, central incisor was found to be putrescent on October 24th, 1914. Treatment of formalin and dressing in canal for one week, when the root was filled.

Fig. 10—The superior right, central incisor. Putrescent November 4th, 1913. Treated with formalin and canal filled.

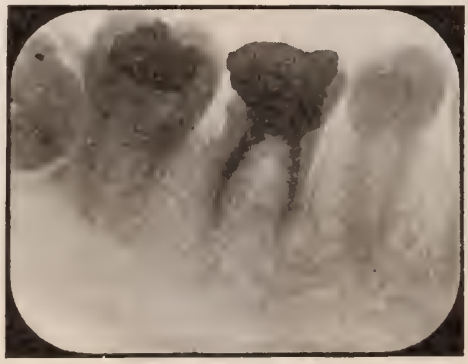

Fig. 11

Fig. 11—The inferior, left, first permanent molar was found to be putrescent on April 10th, 1913. The boy was then nine years of age. Treated with formalin and filled canals.

We are convinced that any drug containing formalin should never be sealed in a tooth, but, by using formalin as has been described, the expansion of the gas in an open root canal does not set up an irritation in the peridental membrane or apical space. "Formaldehyd develops its strongest antiseptic power when applied in vapor form on moist surfaces, but on dry materials it is almost without action. At ordinary temperature it gives up vapors of formaldehyd and at body temperature this vaporization is increased. The vapors of formaldehyd are very penetrating, a factor that is of prime importance in the treatment of putrescent pulps." (Prinz.)

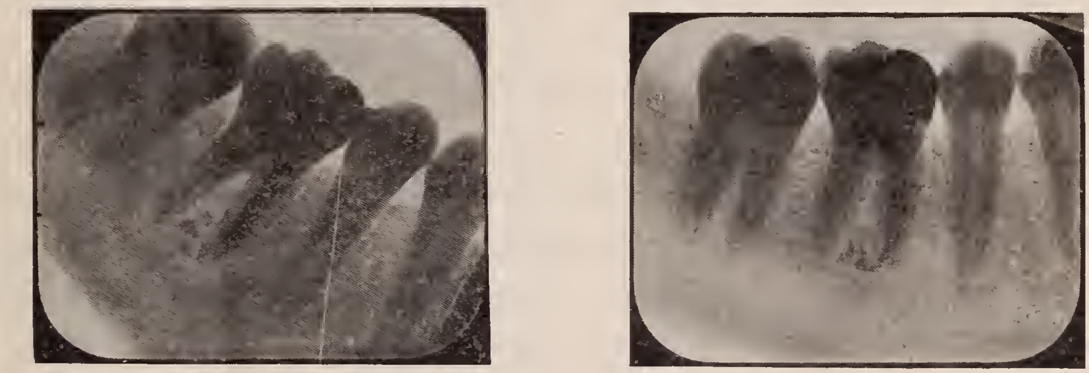

Fig. 12

Fig. 12—At the age of ten years there was a slight exposure in the inferior, left, first permanent molar. This was covered with Dunn's non-sodium cement in an effort to preserve the pulp. This was in November, 1912. In October, 1916 this tooth gave trouble, and on account of its previous history was opened immediately and found to be putrescent. It was treated in the usual manner with formalin on October 9th and the canals filled on October 12th. Gutta percha in the apical space indicates a slight liquefaction of bone tissue. Second radiograph was taken November 28th, 1917. Note improved condition of bone tissue around apices of mesial roots.

All of the credit for this technic and the use of formalin in treating putrescent teeth should be given to Dr. Nichol, as he was, as far as I know, the first person to make use of formalin in the treatment of putrescent teeth, and it was from him that I gathered my technic during my last year in dental colloge, when he kindly allowed me to assist him in the work he was doing at the House of Refuge.

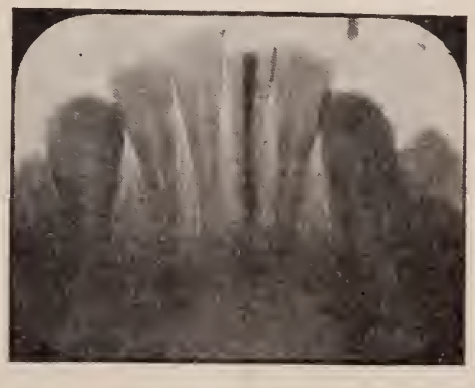

Fig. 13

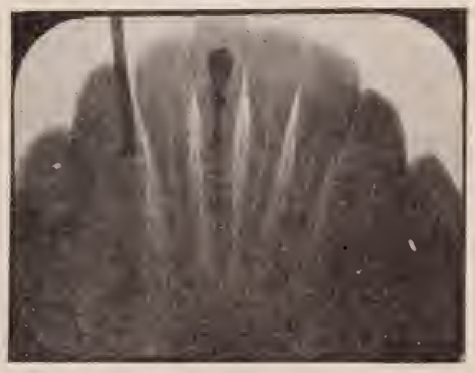

Fig. 14

Fig. 13—The inferior, right, central incisor was found to be putrescent on May 26th. 1914. It was treated with formalin and the root filled at once.

Fig. 14—The inferior, left, central incisor was found to be putrescent December 15th, 1914. It was treated with formalin and the root filled at once. Note improperly-filled canal and yet the condition about the apex of the root is apparently normal after three years.

The accompanying slides are radiographs of putrescent teeth treated with formalin, some as far back as 1913. All of these radiographs were made on November 28th, 1917, and consequently show the condition of the surrounding tissues at this time. The X-ray does not, in my opinion. prove that there is not a change in the bone tissue following the treatment of pulpless teeth. However, we never have found with a radiograph any apparent change in the bone tissue following our treatment. That, of course, could only be proven by historical studies.

The foregoing slides show root-canal fillings in pulpless teeth which were inserted immediately following a treatment with weak solutions of formalin. The boys were between 8½ and 14 years of age. At this age, we consider the treatment of putrescent teeth to be most difficult on account of the large root canals, which necessarily would contain a greater amount of infection than would be found in a fully-developed tooth. Thus greater care must be observed in order that none of the infection will be forced through the large apical foramen into the surrounding tissues.

Girard College.

PLATE PROSTHESIS*

BY N. S. HOFF, D.D.S., ANN ARBOR, MICH.

THAT THERE IS at this time a greater demand for plate prosthesis than ever before may seem to be an exaggerated statement, but any one who will take the pains to make a little inquiry will find that the statement is literally true. We may cite several reasons for this condition which will not only corroborate the statement but also will justify the prediction that this demand is to very materially increase in the near future.

First there has developed a strong sentiment in the minds of the public that all diseased teeth in which the tooth pulp or the root environment is implicated had better be extracted. This is the result of the medical writings and investigations which were started by the arraignment of our profession for initiating systemic diseases by careless crown and bridge work, first, by Dr. Hunter, and afterwards by the medical profession generally and by our own research men. This crusade has been maintained so persistently, especially by medical writers, that physicians generally do not hesitate to condemn to the forceps the teeth of patients inflicted with any obscure sources of disease for which they are unable otherwise to account. This practice and advice has become so prevalent that many of our patients have become obsessed with the idea, and do not regret to sacrifice teeth which are, or easily could be made perfectly healthy and inoffensive. It will take heroic and persistent effort on the part of the dental profession to turn back this stampede, because of the strong endorsement given the practice by medical practitioners. It may be corrected, by a strong propaganda for better treatment of pulpless teeth, simpler and more efficient methods of crown and bridge restorations, and a general betterment in technical efficiency, as a guarantee against the present indictment of unsanitary dentistry. Our present expensive methods of rendering these services in a sanitary manner may prevent the majority of patients from taking advantage of the highly-skilled service required; and they probably will do as many today are doing, take the alternative and sacrifice their natural teeth for plate dentures.

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*Read before the Ohio State Dental Society at Cleveland, December 4, 1917.

We are also not quite certain that much of our plate prosthesis may not be justly condemned because of unsanitary results due to careless and unscientific designing and construction. Plate prosthesis is perhaps not so insidious a menace as to render it liable to the censure of our medical friends.

Whether or not we may be able to justify crown and bridge work by any or all our efforts that are practicable, the plate prosthesis demand is here now in a most urgent fashion, and it must be met in a professional way that will justify our assuming responsibility for oral health in its entirety.

We can not ignore plate prosthesis or delegate it to others even if we are so disposed. Our choicest patients need it and we shall lose their respect and confidence if we fail to serve them in this emergency.

One of the chief difficulties encountered in presenting this subject is the prejudice existing in the minds of some of our most conscientious practitioners against plate prosthesis, because it is not an agreeable or remunerative service. Most dentists claim that it is technically so exacting that the remuneration does not compensate for the skill required to render a proper or satisfactory service. If there were time it might be profitable to examine the reasons put forward in justification for the seeming neglect by the better men of this department of practice; but we presume each one knows why he does not encourage this service in his own particular practice, many really feel no particular responsibility for it because their time is all consumed in other services, which seem to be of much more vital concern. We realize that such an attitude is perfectly honorable and may be strictly ethical; and yet we can't help knowing that the result may be most demoralizing, if not disastrous, when we find that it consigns this important individual service to the advertising dentist or the dental laboratory, making it a commercial and irresponsible rather than a professional service.

We never have been able to see how so important a professional service as the restoration of the entire function of mastication can be looked upon as merely the mechanical performance of a skilled artisan, and much less can we harmonize customary ideals of professionalism with the indifferent attitude of the profession to this important service.

It may be that it is professionally more commendable to conserve the natural teeth than to restore the loss of function by artificial substitutes, just as conservatism may be more idealistic if not more ethical. If it were practicable and customary for us to realize our ideals irrespective of this matter, and plate prosthesis was not so persistently demanding our attention, we might leave the whole question to its own solution. But the fact is that plate prosthesis is again gaining an important place in our best practices, because extensive bridging is being more and more discredited, and as yet no substitute so unobjectionable as the plate denture has appeared. Are we willing to delegate this important service to the commercial laboratory for our good patients who have been perfectly willing to pay any fee for conservative treatments, or consent to the patient's notion of demanding this service on the traditional fee basis, so that we can't afford to do it? As a matter of history has any consistent effort ever been made, except by a practitioner here and there, to place this service on the same basis as other conservative efforts, so far as a proper and compensating fee is concerned? On the contrary it seems that the lack of interest on the part of the profession in this subject has permitted it to drift into the hands of the incompetent, and inevitably, because of unscrupulous competition, to become an article of barter, and eventually to have a traditional price put upon it for which no self-respecting professional man is willing to be bound.

To meet this question in a proper professional way it would seem that our plain duty is to attack the problem in the same spirit and by the same methods that have succeeded in other departments of practice. This may mean for some of us that we shall have to retrace our steps and relearn our prosthetic technic, and for some it may involve giving of time to perfecting our knowledge of the principles involved, in part at least; and for all it will mean a determination to be prepared to meet this requirement with adequate skill and a proper appreciation of its requirements from ideal and professional requirements.

SOME REASONS FOR BETTER PLATE PROSTHESIS.

Obviously the fundamental objective to be kept in view is to give our patients the most perfect function of mastication that science and our art can conceive and produce. Nothing short of this will meet our ethical ideals. This will mean that we must use all the knowledge and skill that we possess to provide for each individual patient a means of securing all the food intake he needs, and in such condition that it may be readily prepared for digestion and assimilation. It will not be necessary here to discuss this further than to say that all dentures should be constructed of appropriate materials, be accurately adapted to the mouth, and their occlusal and articular relations should be such as shall imitate the normal functions most perfectly. The management of artificial dentures by the patient is a matter of concern, and the dentist who ignores giving his patients explicit instructions as to the proper care and use of his dentures is not doing all he should to promote his patients' best interests. Most patients wear dentures too long without having them refitted. They wear them constantly and without proper rest periods for the soft tissues, producing unsanitary conditions. Patients who are wearing artificial dentures should visit the dentist at regular intervals for inspection as to oral conditions of an unhygienic nature that may develop because of neglect or ignorance on the part of the patient. It may not be necessary for plate patients to visit the dentists as often as prophylaxis or pyorrhea patients, but certainly no patients should wear any denture for twenty years, or ten years, or even one year, without having it carefully examined at suitable intervals by the dentist. Vulcanite dentures should not be mended and patched indefinitely simply because they fit so well that they will "eat corn off the cob without any trouble at all." A vulcanite plate that has been through the vulcanizing process two or three times has changed its form and material so much that it is not fit to be worn, and it becomes a disease-breeder. Unclean and unsanitary dentures from any cause are not only an injury to the person wearing them but are often offensive to others and may be a means of spreading disease.

If there is any possible way in which plate dentures may be carriers of disease to others they certainly come within the jurisdiction of the guardians of dental health. It perhaps never occurs to the average dentist that he has any such obligation, but the educated dentist is certainly best qualified to protect the innocent from harmful dentures. Most dentists until recently had no thought as to their accountability for their patients' general health, so long as they could restore function to mutilated dental arches by plates or bridges constructed wholly from the view point of mechanical technics. Our pyorrhea specialists, orthodontists, and dental surgeons also seemed to have been indifferent to the harmful consequences that may result from nervous shock and systemic infection, until we were abruptly called to account by our medical friends. The strange thing when we reflect on the matter at all is that dentists have not long since been impressed by the possibilities of systemic infection from the almost nauseating conditions so generally seen in the mouths of patients who are wearing artificial dentures. Many patients keep their dentures decently clean, but too many seem to have the same idea as the boy had, who, when reprimanded because he had not blacked the heels of his boots, replied, "Oh, what's the use; nobody ever looks behind."

We have all seen mouths in which the alveolar process has fully resorbed long before its time, and the gum tissue was soft and even diseased because of lack of the simplest hygienic attention. Such patients always are interested when their attention is called to the condition of ill health that is plainly evident in their mouths. They will even say to us that nobody ever told them it was necessary to brush their false teeth; and they will express great surprise when you suggest to them it would be just as sanitary for them never to take a bath, or that they might just as well sleep with their boots on as with their dentures in their mouths. From much observation along this line I am convinced that the profession is too largely giving plate prosthesis into the hands of the thoughtless and mercenary practitioners, and it may not be long before we are again called to account for such gross and incompetent professional conduct.

There is a general sentiment prevailing at the present time for the delegation of this work to specialists, as the demands upon the general practice leave no time for such services. This may sometime be the solution of this problem, but it will be a long time before we can train enough especially qualified dentists to properly care for this work; and it will be a longer time before the public can be taught to accept this kind of service. It has been done to a limited extent and satisfactorily too, in some of our cities where the properly-prepared man was located who was of large enough caliber to carry the proposition through, but it is practicably impossible to sustain such specialists in the smaller communities where the environment is more unfavorable. We have watched with much interest the development of the commercial laboratory to see if this institution might not bring relief. From the very nature of the case its ministrations are altogether impersonal and technical and never can do more than to take care of the mechanical details of construction. The limitations of this institution promises little help for the future of better prosthesis. The fees obtained by dentists practicing in the smaller towns are so absurdly near the actual cost of production and have by long practice become so traditional, that the incentive for adequate compensation promises no stimulus for improvement in this direction.

We have then in our picture plate prosthesis, of the ideal type, tabooed by our most progressive and capable practitioners and shifted largely to the commercial laboratories; pauperized by the practitioners in the smaller communities and served on a wage basis; sought by the general public from the mercenary charlatan on a commercial basis; and no movement in sight which promises a better standard of professional service. And all this in view of the fact that in other departments of dental service, methods of practice having a sanitary relation are being exhaustively studied by all the best resources at our command, that we may adjust our methods of practice on a scientific basis of health restoration and conservation.

We have no desire to detract in any way from the most excellent work that is now being done in other departments of dental research and practice, but we are inclined to raise the question strongly as to whether plate prosthesis may not be of sufficient value as a health proposition to claim an interest in some measure comparable to that we are now giving to the problem of root-canal treatment, periodontal diseases, conductive anesthesia, and numerous other branches of practice that have absorbed our science workers for the past decade or more.

It might also be pertinent to inquire if we do not owe something to our edentulous patients? Some perchance may require this service because of our neglect, or lack of skillful attention. At any rate they are in a condition where all degenerating tendencies are more active or potent than at any other period of their lives, and they in most cases deserve the highest type of denture relief that is practicable. They certainly are entitled to our kindest sympathies reinforced by adequate technical ministry. We are conscious that most practitioners have done what it seemed to them was possible in taking care of this department of practice, but the point we would make is that its relative importance as a skillful and scientific department of practice has not received the cordial sympathy and support that some other departments seem to have had.

We do not mean that no advancement has been made in plate prosthesis as an art or science—because some very important advances have been made within the past few years—but we are referring to the neglect of putting into practice what is today known of the modern methods of denture construction, by those dentists who are meeting similar issues in other departments of service with commendable zeal. It is hoped that our pride in our profession may excite our loyalty to the extent of taking care of this service in a truly professionally way and so rescue it from the condition of reproach in which we now find it.

It can not be said that lack of knowledge or skill can excuse us for an indifferent attitude toward this matter. There never was a time when we had better materials for constructive purposes, nor more accurate knowledge of the principles involved. It may also be said that technical procedures have been so refined and made so precise that any one who desires can find here ample scope for all his ambitions, technically, artistically, and scientifically.

As we see it the great need is for an awakening of the professional conscience to the fact that there is a great human need in this matter, that is not being supplied by the profession as it should be, and that it is fast drifting into the care of the unprofessional if not the unskilled. And it is likely to become a reproach to the profession, because it can not be separated from its professional connection without being commercialized and probably debased to an extent that will detract from its technical standards and most useful service.

It will be necessary to change the attitude of the profession toward this matter in other ways before ideal consideration even of this question can be expected. The profession will have to consider plate prosthesis, at least on a par in importance to our patients, with any other service. It also will become necessary for the profession to adopt some professional method of handling this subject in a general practice in an ethical and business-like manner.

We do not believe it will be difficult to convince the profession that this subject can be handled in the private practice on a strictly ethical basis, and that it is possible with some extra help to arrange so this can be done in a way that will bring better results to our patients and a more dignified and compensating fee.

There are no more appreciative patients than those who are satisfactorily served in this department, and there are none who will resent any reasonable fee for such services, when they are made intelligent as to their own needs and the efforts that are being made to make the service as valuable as possible for them. A superior service in this department also will bring great satisfaction to the operator, generally in proportion to the difficulties met and overcome; and it has the same tendency to encourage one to make his endeavors in other cases more successful, not for his patients' comfort and happiness only, but for the very joy that comes from mastering the difficult task in a worth-while cause.

I have a notion that if the profession can get the true vision of the importance of this matter that there will be no more slacking in loyalty, and that ways and means will be found for utilizing the best technical talent we now have, and that too without compromising our professional dignity. For instance, there is no reason why most of the purely mechanical or structural work may not be done in the private office by a trained technician, so long as the designing and operative procedures are in charge of and under the direct control of the dentist. It also may be practicable to refer certain stages of the construction features to an approved dental laboratory with advantage to all concerned.

Our ideal might be reached, for instance, by some such general procedure as the following: The diagnosis should be made by the dentist, who should take the impression and secure the bite, select the teeth and refer the case to the technician for the mechanical procedures up to the temporary denture for trial test before the teeth are permanently attached to the plate. In this trial test all functional data should be verified, and all artistic treatment should receive final revision. The denture then could pass back to the technician for finishing, and be again fitted to the patient by the dentist.

At this final adjustment the dentist's whole duty will not have been done until he shall have made the patient intelligent about the use and hygienic care of his new acquirement. I am not advocating this method of handling this troublesome question as the ideal one, but as one which might be a compromise measure for those who do not see how they can handle this subject in a busy practice for lack of time, etc. It of course would be ideal if every part of the treatment and technical work could be done by the dentist, for obvious reasons; but we can see no serious objections to the delegation of the mechanical details, which consume so much time, to a competent artisan, so long as the essential features are kept well in hand and directly under the control of the dentist. This would imply that the operator should be the master of the whole process of construction, including of course the business, hygiene, and educational features. It would in all cases make for competent designing, construction, and adaptation.

IMPRESSIONS.

With this preamble or foreword, we want to say a few words about one of the most important steps in the construction of plate dentures. The first step, diagnosis, is also of prime importance, but we shall not take up at this time a discussion of the principles involved or methods of making a proper diagnosis for all plate dentures. In most cases this is a comparatively simple matter, but in some cases it is an exceedingly complicated and difficult proposition which requires a considerable knowledge of disease processes and health problems.

It is the second step—that of securing casts upon which to construct the denture—that is fundamentally of such importance that it is the one most common cause of failure resulting in ill fitting and unhygienic dentures. It is also one of the things that we may not refer to the office boy, or even to the commercial laboratory. A competent cast can not be obtained without first securing an accurate impression of that part of the mouth which it is proposed to involve in the denture.

Ordinarily we are satisfied with an impression which reproduces the general surface form and detail of that part of the jaw which we intend to include in the denture area. And usually we are best satisfied if we have secured this impression with the least possible disturbance of the soft structures as they are found, regardless of whether they are healthy or not, or whether they are in the best condition for supporting a denture. And as a rule the material to be used in constructing the denture is not considered in its relations to the impression.

While we can't here take up the important matter of a complete diagnosis of the mouth with preparatory treatment in view, in many cases this is of very great importance in order that a properly-adapted denture may be constructed, one that will have the useful and health functions cared for in the best possible way. The condition of the oral tissues always should modify the process of impression taking. We might select an impression tray with no other data than the size of the jaw; but we could not take a proper impression for all cases by using any one impression-material for all cases, much less by using any material always by the same technical procedure. We must therefore ascertain the difficulties with which we have to contend, before we even can experiment with any material or method.

In some mouths the soft tissues are firm and healthy and there are no useless tissues encroaching on the desired plate areas, and no alternating hard and soft areas. In such cases all that is required is an impression with some material that will give accurate form and surface detail, such as can be secured readily by plaster of Paris, for instance, by the usual methods. A plate molded or stamped on a cast from such an impression would undoubtedly fit and maintain adequate adhesion when subjected to the forces of mastication. Such a result is possible also with other impression materials, such as the plastics, but it would require a more resistant impression material and a much modified method of handling it to secure an impression proper in form and surface detail in a mouth, for instance, in which there were hard and soft areas, and other complications such as overhanging processes, or muscle attachments encroaching on the plate areas.

It is also highly important that mouths in which the soft tissues are relaxed and swollen, or in a chronic condition of disease which would preclude a substantial basis of resistance and support for the denture when subjected to the stress of mastication, should be treated with appropriate impression methods and materials to provide such physical correction of these conditions as might be brought about by the denture.

Too often no thought is entertained of changing abnormal conditions by means of a properly-adapted denture, except by the substitution occasionally of a metal for a vulcanite base. There is no question but that resolution of diseased gum tissue can be promoted by well adapted base plates of any material by frequent refittings, in order that sufficient support may be had to provide the needed stimulating influence on the nerve and blood supply so as to increase adequately the trophic or healing functions. We have seen excess gum tissue, or loose and flabby tissue, and even diseased itssue, reduced to the normal by changing the form of the denture so that it rested accurately and uniformly on the entire plate surface. By refitting as often as may be necessary, as healing takes place, and also by providing smooth and clean surfaces which come in contact with the gum tissue, much can be done to correct abnormal gum conditions. Faulty occlusion is a frequent source of irregular absorption of the alveolar process and the cause of soft areas which make firm plate-seating almost impracticable. Everyone has noticed, in mouths where the lower back teeth are lost and a full upper denture is worn which throws the force of mastication on the front teeth entirely, that the upper incisal alveolar process resorbes entirely, leaving only the soft tissues in position, which offer no adequate support for the plate except the adhesion caused by the close adaptation of the soft gum tissue. In such cases the surgical removal of this soft gum tissue and new plates made from proper impressions will produce gratifying results. Repeated refittings of plates, without surgical interference, and the re-establishment of proper supporting occlusion may also in time correct to some extent such conditions.

In all such treatments the method of securing the impression is the important factor in getting satisfactory results. An impression in such cases taken with an indifferently-adapted tray and a non-resistant impression material like plaster, however skillfully manipulated, will not insure the best results. What is needed is an impression that will take exactly all the form of the area to be covered, and at the same time compress all the soft structures to as nearly an equal resistance as may be possible.

A denture made on a cast from such an impression should be worn by the patient only so long as it produces the needed support, and it should then be refitted on a new cast made from an impression obtained in the same way. It may be unnecessary in this connection to say that the time when the denture should be refitted or even remade should not be determined by the patient, who will base his judgment on his ability to keep the denture in place while eating. The operator should determine this by careful inspection of the mouth, as to the condition of the gum tissues, and the effect produced by the occlusion of the teeth. We are confident that a few tests made along this line will convince any one of the possibilities for making better adaptations of plate dentures, and of rescuing demoralized oral tissues by this form of technical treatment so that a new interest in plate prosthesis will follow and better methods will result.

We have no desire to urge upon the profession any pet method of impression-taking except that out of an interested observation of current methods we have come to the conclusion that much more interest must be taken in this subject by the profession, or we shall not realize all the benefits that the helpful facilities we now have at our command for giving comfort and relief to those who are unfortunate enough to require plate prosthesis.

We have available three distinct impression materials, each of which has a physical peculiarity of its own which qualifies it for the various requirements of adequate impressions. There are also a great many methods of manipulating these materials which when properly utilized develop their inherent values. Without spending time in a critical review of these materials and the various technical treatments for specific results, we will make only the briefest possible reference to a few of the present day methods of using them.

Plaster of Paris probably is more generally used than any other material, probably because it is inexpensive, easily manipulated, and seems to take accurate form and detail. It lacks ability to compress soft structures because of its fluidity in a workable condition. It therefore can not be used advantageously in many cases where this property is very important for successful adaptation of the denture to get hygienic results.

Modeling Compound is perhaps the next most used and highly valued material. It is easily made plastic enough by moderate heat to render it useful in securing form where no considerable undercuts or irregular conditions are involved. It also, when properly manipulated, will secure enough accuracy in surface detail for practicable results. It is to some extent incapable of being manipulated so as to secure compressive results, comparable to that which may be secured by other materials. It is used exclusively by many of our best prosthodontists with evidently successful results. It requires, however, greater skill to accomplish desirable results than plaster of Paris.

Beeswax is the oldest known impression material, but it is not generally valued because of its incapacity to reproduce accurate surface detail. It excels in its ability to compress the soft areas and to displace encroaching tissues from the plate margins. For this reason it is highly esteemed by many skillful operators. Its technical manipulation for accurate results requires about the same treatment as modeling compound.

Almost innumerable suggestions have from time to time been advised to make the art of impression taking more accurate, which we shall not attempt to review at this time. The most successful efforts to improve the accuracy of impressions at the present time seem to be in the direction of more careful manipulation of modeling compound, and by a combination of either modeling compound and plaster of Paris, or by a combination of beeswax and plaster of Paris.

The modeling compound methods of Dr. J. W. Green, as commended and advocated by Dr. W. A. Griffin, of Detroit, are familiar to you all, and the technic developed by Samuel Supplee, of New York, for taking modeling compound impression of full dentures by what he terms the closed-mouth method, are perhaps the most conspicuous illustrations of the use of this material.

Neither of these methods uses the combination method of modeling compound and plaster as advocated by Dr. Green, and later by Dr. Rupert Hall, of Chicago, a complete demonstration of which was made in the clinics of this Society last year at Dayton.

It is the combination method that I wish to commend for your consideration at this time, which, so far as I can determine, was first advocated by Dr. Wescott, *Cosmos* April, 1870. I have improved the technic with a definite object in view but make no claim of originality for the method. From a considerable experience in impression taking by all known methods I am convinced that more accurate results are practicable to the average dentist with the combination of beeswax and plaster of Paris than is possible by any other method or combination of materials. Similar results are practicable with a combination of modeling compounds and plaster, but the technic is not so expeditious, nor is it accomplished with the same degree of definiteness in most cases.

The chief advantage of wax over modeling compound is due to the greater adhesiveness of wax in its plastic state, and the greater facility of its manipulation.

It may be utilized advantageously in practically every condition or form of the jaws from the completely edentulous to the partially edentulous, with much irregularity of form.

I shall briefly describe the process, and hope later to illustrate by a few lantern slides the technic, which perhaps could much better be illustrated by a table or chair clinic.

The basic principle of the technic is to secure by the Green or Supplee methods as perfect an impression in wax as is practicable. This means an impression taken by repeated reinserting, trimming, and manipulating the wax until an impression is secured that is accurate in form, and includes all the plate area, with accurate extension of the plate rim and palatal margins. In addition an effort is made to compress all the soft or excessive tissues to an equal resistance. It may be said here that in some cases no special compression or displacement of soft tissues is needed. In such cases only the form is required, but this should be accurately obtained. If the wax is properly manipulated it is possible to get as sharp detail in most cases as is needed, but where compressive effort is made in mouths in which the delicate lines are not normally resistant the wax is liable to compress excessively or flatten the flexible tissues. This is not desirable of course, and is overcome by carving the wax in such areas so that these tissues will be taken in the normal form by the softer plaster, and with accurate surface details resulting.

The results, while primarily dependent on the accuracy of the wax impression and its equalizing force, is also largely dependent on how the completed wax is carved to secure the accurate detail, and at the same time retain, or possibly increase the compressive force at such parts of the surface as may be desired.

For this purpose the mouth is carefully inspected after the wax impression is secured, and the hard areas located. Then a thin shaving of the wax is removed from the impression at these hard portions. By this means the wax when reinserted with the thin solution of plaster will bear harder than ever on the soft areas and the plaster over the hard areas that have been carved will take a sharp impression and because confined will also compress, but not with the same force as the areas where there is only a little or possibly no plaster at all.

From this it should be realized that the carving should be done with a great deal of care, and only at all in cases requiring reciprocal compression.

It is essential that the wax form should be accurate to start with. By this I mean that all superfluous wax should be eliminated, and that the impression should cover only the exact area that the plate will eventually cover, no more and no less. The final wax should also on test adhere so securely to the mouth that considerable force or juggling is required to dislodge it. Then it is removed from the mouth and carved as indicated, being careful not to carve the periphery, or the rim, or palatal border, so that the thin plaster may not escape by a gateway, as the compressive effect of the correcting plaster will be lost.

If this method is accurately carried out an impression so accurately fitted will be secured that in some cases great difficulty will be experienced in dislodging it from the mouth. The cast obtained from such an impression will accurately represent the mouth in its truest and best form for a health-producing denture.

The method of course will need to be modified to meet the varying conditions of the oral tissues. In some cases the wax should be worked to produce its maximum compression, while in the opposite extreme cases very little force should be used and the waxed worked as warm and soft as practicable.

In the Rupert Hall method of taking the combination impression no effort is made to get a compressive result with the plaster lining. By this method the modeling compound impression serves only as a well adapted impression tray and the plaster takes an accurate impression true to form and properly extended as to rim margins. In cases where the tissues are equally resistant and there is no apparent need of compression the Hall method is better than an all-plaster impression only, because an accurately-fitted tray is used, and the patient is permitted to mark definitely the rim margins.

Dentures made on casts obtained from such impressions ought to fit, perhaps better at first than by the wax and plaster combination; but I am confident they can have no beneficial results in restoring the soft tissues to a normal condition, and I doubt if they may not as time goes on show a progressive degeneration of the gum tissue.

By a modified technic the wax and plaster impression is most valuable for securing impressions of partial cases also. Especially where accurate results are required in cases where very irregular or deformed teeth have to be included in the impression. The method here is not to use it so much to secure compression as to get accurate form, which we ordinarily secure by the use of plaster alone. By this method it is possible to include in the impression only such areas as are to be used, and also to secure impressions of the parts with accuracy and the least possible discomfort to the patient. I may say that for partial impression, modeling compound may be used also in place of wax if desired, but it is more difficult to manipulate. It makes a harder and stiffer matrix, which in some cases is desirable.

In conclusion I wish to say that the purpose of this paper is not to exploit the author's ethical ideas, or any personal claims for invention; but to contribute to our technical methods that which he hopes may add to the comfort and accuracy of plate prosthesis, so that plate prosthesis may make a stronger bid for a greater participation by the better men in developing a better class of artificial substitutes. We also hope that we may have more satisfactory results by employing more exact methods. It is, after all, the ends for which we strive that are important and any means that shall help us to secure ideal results ought to enlist our loyal consideration and support.

ILLUSTRATIONS OF TECHNICAL METHODS.

The following illustrations will show somewhat imperfectly the technical method used in making the wax-plaster impression. It is quite impossible to get good photographs of wax impressions that will show the details desired.

Fig. 1 is intended to show an ordinary wax impression as it is usually made. As usual it shows much excess of material and imperfect form. Before placing the warmed wax in the tray, the tray should be dried and warmed so that the wax will adhere positively. An excess of wax should be used so that the entire area to be covered by the denture may be taken. Then the usual wax impression is made, being careful to carry the wax well up on the buccal and to include the margin of the soft palate. Remove the wax impression from the mouth and carve away all the excess wax from the rim and palatal portions exactly to the plate limits. If there should be any place where the wax was not sufficiently extended, add wax as needed. Then carve the rim margin to a thin edge to prevent distortion of the buccal tissues. Now re-warm the surface of the wax and replace in the mouth and carry to position using as much firmness as the tissues require to get the proper condensing and equalizing resistance. This impression should adhere with good suction when removing; if not, again trim away any excess, re-warm and press to place again. Repeat this operation until a satisfactory adhesion is secured. This will give the wax as shown in *Fig. 2.*

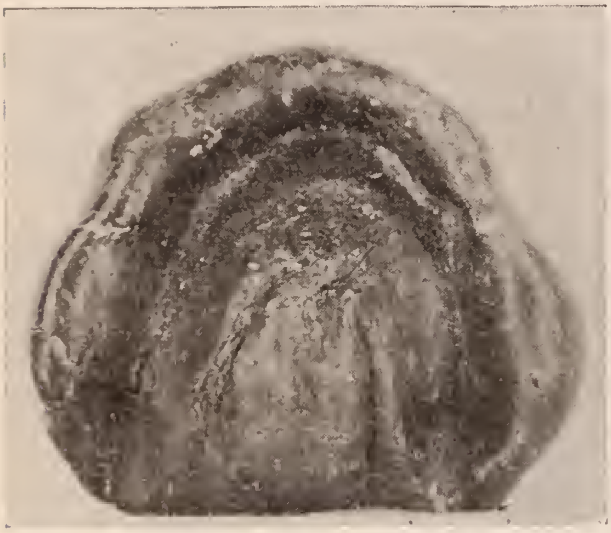
Fig. 1

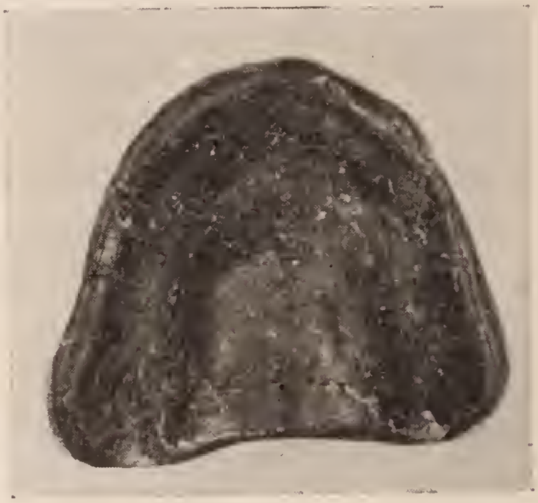
Fig. 2

Now make a digital examination of the mouth and locate any definitely hard areas. These areas should then be carved away in the perfected impression with a wax spatula or curved knife to a depth varying with the comparative hardness and softness of the contiguous tissues. This may vary from the sixteenth of an inch to perhaps an eighth of an inch. Be careful not to carve deeply where the tissues are at all soft or a folding of the tissues may occur, which will mar the plaster corrected impression. It is difficult to show this carving in a photo, but some idea may be had of it by referring to *Fig. 3*.

Fig. 3: This should show carving over the intermaxillary ridge, a groove across the palatal portion about an eighth of an inch inside of the margin, and a similar groove just inside of the rim. These grooves will prevent the plaster from running away and insure a perfected impression of the plate margins in plaster. If the rugæ in the front part of the palate are soft it is sometimes wise to carve them slightly so that the rugæ will appear in the model in their normal form, rather than in a flattened form. The idea is to throw the compression always on the soft tissues and relieve the hard areas. Carving the wax rim to the exact limit of the plate rim insures proper plate extension, and the plaster flowing over the margins as well as the palatal border will indicate the proper extension and give the corrected form. In this way plate extension is secured with accuracy and a close fitting of the rim and palatal border is obtained.

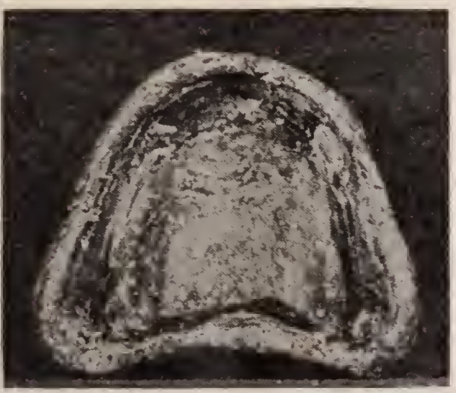

Fig. 3

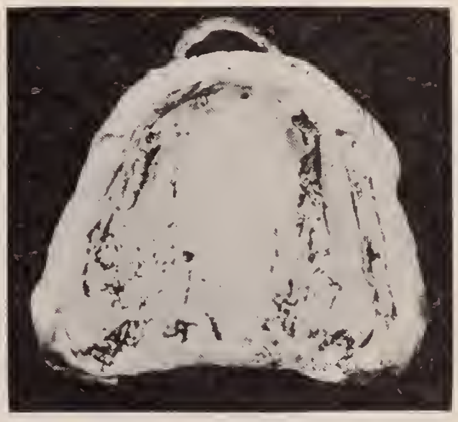

Fig. 4

Fig. 4 shows the carved wax impression with the plaster correction. After the wax impression is carved the surface should be gone over with a sharp-pointed instrument to roughen the surface of the wax so that the plaster will adhere firmly. Fine impression plaster is then mixed with water containing more potassium sulphate than is ordinarily used, to make it set promptly, and while the mix is quite thin, pour enough into the impression to cover the surface and rub it quickly onto the surface, then throw out the excess and pour in enough more plaster to thinly cover the surface and insert it quickly in the mouth and hold firmly and steadily until it has thoroughly set. The amount of pressure used will be determined by the nature of the tissues and the degree of compression required. The same manipulation of the lips and tongue as advocated by Green, Supplee, and others, will help to define the rim margins, but it should not be overdone, only the slightest muscle trimming is needed and it should be made immediately after the impression is forced to place and only for a moment while the plaster is yet soft.

Fig. 5: This shows a wax impression of a lower partial denture with many irregularities which usually is attempted only with plaster. The teeth are very irregular in form as well as in position. This impression was first taken in wax with such excess of material as would give all the surface to be covered by the plate. The wax impression is then removed while the wax is still soft, and all the surplus wax trimmed away. It is again warmed on the surface and replaced in the mouth, several times if necessary, or until the impression can be readily removed from the mouth with the fewest drag marks. Then chill in ice water and with an Evans carver or a spatula, carve out opposite each irregular tooth a considerable depth of the wax, including all the wax that was distorted by the withdrawal of the impression. Where the carving is done the wax should be left as smooth as possible to facilitate the separation when taking the plaster impression, or in difficult cases the wax may be slightly oiled. The groove is then carved around the impression margin as in the full upper to get the corrected plaster impression. The surfaces, except where carved, are then stippled with a sharp-pointed instrument as before, and it is ready to take the plaster impression. The plaster correction is made the same as with the full upper, and when it is removed from the mouth the plaster cores should remain attached to the teeth in the mouth, from which they are easily removed and replaced in the wax impression where they belong; the impression is thus completely restored. The advantage of the method is in the ease with which the parts are reassembled because the plaster

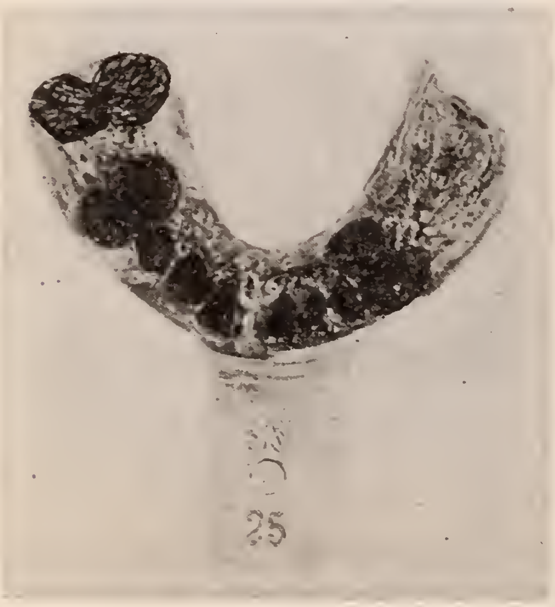

Fig. 5

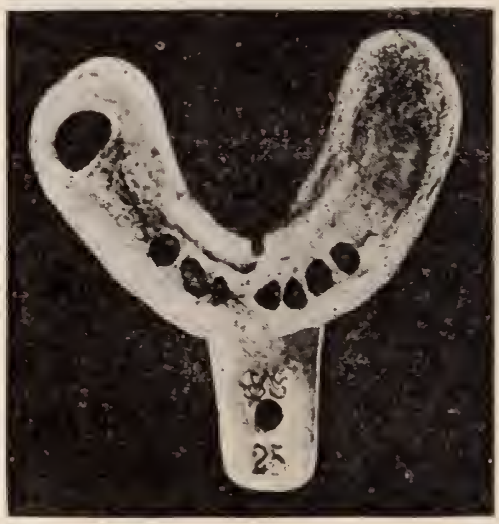

Fig. 6

cores are made to break at predetermined places and they are thus more readily assembled.

Fig. 6 shows the combination impression restored and ready to be poured.

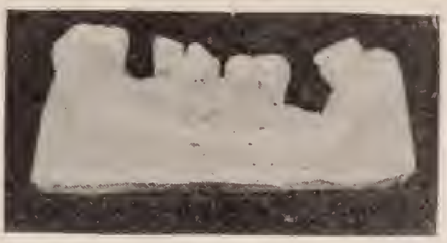

Fig. 7

Fig. 7 shows the model made from the impression. It has not been carved or corrected in any way, and it is just as it was when separated from the impression. This is one of the cases which could not be made with any of the plastic materials alone, and it would be difficult to get it with plaster alone; but the most difficult cases can be taken easily by this combination method and with perfect comfort to the patient and operator.

Can Pyorrhea be Cured?

A complete history as to the patient's mode of living, habits, various constitutional disorders should be taken by the dentist before he begins to treat him. This would not only assist the dentist in carrying out a successful treatment in his dental line of work, but by so doing he would carry out a great mission in sounding to his patient the dangers that may result from bodily disorders hitherto unknown to him. The dentist in a majority of instances is able to do more good work towards prevention of disease and alleviation of human suffering than the medical man would, as those who consult the dentitst for pyorrhea usually do not know of any other conditions that contribute to its formation and they are unaware of the dangers that might confront them through lack of proper treatment. The world will some day be very grateful to the dentist for the good and relief he will bring to human sufferers. The final word is: Pyorrhea can be cured. but only by those who have an understanding of the causes of it.

—*H. Schwartz (M.D.), N. W. Journal of Dentistry.*

Readers of THE DENTAL SUMMARY should know that the reduction in number of pages in the advertising section is a "Win the War" measure, taken in compliance with Government request.

FRACTURES AND DISLOCATIONS OF THE JAWS*

BY CHALMERS J. LYONS, D.D.SC., ANN ARBOR, MICH.
PROFESSOR OF DENTAL SURGERY, UNIVERSITY OF MICHIGAN

DISLOCATION OF THE JAWS.

A DISLOCATION is defined as an abnormal displacement of the articular portions of the bones, entering into the formation of a joint. While dislocations of the lower jaw are not rare, yet these dislocations are not as common as are dislocations in other parts of the body.

[1] Stimpson states that "compared with other surgical injuries, dislocations (in general) are infrequent; the proportion to fractures is about 1 to 10."

In a compilation of 1527 dislocations, he found 61 dislocations of the lower jaw.

Two principal classifications may be made of dislocations of the lower jaw viz., bilateral and unilateral. Of these the bilateral is the more common, the proportion being about 5 to 2, according to Malgaigne.

These again may be classified as:

1. *Simple,* one in which the joint is not penetrated by a wound.
2. *Compound,* one in which the contiguous tissue is torn to the outer surface and the wound is in communication with the outside air.
3. *Complete,* one in which the articular surfaces are completely separated.
4. *Complicated*, one which is associated with other injuries, such as fracture.
5. *Habitual,* one which frequently occurs after reduction.
6. *Recent,* one in which there is no complicating inflammation.
7. *Pathologic* or spontaneous, one which results from disease.
8. *Traumatic,* one due to an injury or to violence.

ETIOLOGY.

In order to understand the etiology of dislocations of the lower jaw, a knowledge of the comprehensive mechanism of the temporomandibular articulation and the normal movement of the mandible should be studied.

* In the temporomandibular articulation, the socket is formed partly by the mandibular fossa and partly by the articular eminence,

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[1] Stimpson's "Fractures and Dislocations."

* Sabotta and McMunich Human Anatomy.

and over the latter an approximately congruent surface for the head of the condyle is formed by the articular disk. The two temporo-mandibular articulations act simultaneously. When the mouth is opened, the head of the condyle with the inter-articular disk glides forward on the articular eminence, and when the mouth is closed it slips back into the mandibular fossa. The opening and closing of the mouth are consequently attended by a sliding of the mandible (a sliding joint).

In addition to this modified form of hinge movement, the articulation possesses a second kind of motion, viz., the lateral displacement of the mandible in reference to the skull. In this movement, one condyloid head remains in the mandibular fossa and rotates on pivots on the center, (the rotation being accomplished by the action of the pterygoidens internus muscle) while the other advances on the articular eminence, a movement which is impossible when the mouth is opened to its greatest extent. Both the hinge and the lateral movements are combined in the act of mastication.

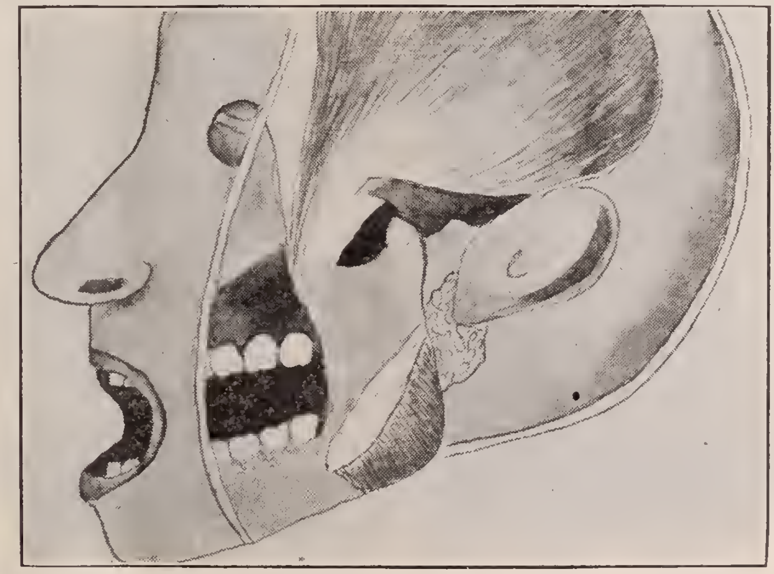

Fig. 93

The movements of the jaw are limited by the capsular ligament. The anterior portion of the capsular ligament is not strong and usually is ruptured in dislocations of the jaw.

Dislocations of the lower jaw usually occur when the mouth is open and when the head of the condyles are forward on the articular eminence. The head of the condyle then may pass over the articular eminence on one or both sides. *(Fig. 93.)* If on one side a unilateral dislocation is constituted and if both condyles pass over the articular eminence, a bilateral dislocation results. The contraction of the masseter and temporal muscles draws the condyles up against the interior surface of the zygoma and becomes locked. Backward dislocation cannot occur without fracture of the tympanic portion of the temporal bone.

These are caused by great violence received upon the chin from before backward. One or both heads of the condyle may be driven through the tympanic plate into the external auditory canal. This may occur quite easily if the mouth is held partly open when the blow occurs or in an edentulous jaw when there is no support given it by the opposing teeth.

The symptoms are pain and hemorrhage from the ear, immobility of the lower jaw and displacement backward.

The author in 1914 had a case of this type where the backward displacement was the distance of l. c. The patient was working in a railway machine shop and was struck on the chin by a flying piece of iron. The lower jaw also was fractured at the symphysis.

A few cases of upward and outward dislocations have been reported by LeFevre, Roberts, Neis and others, but this type of dislocations is very rare.

By far the most common type of dislocation is forward. Any pathologic changes in the glenoid fossa which would result in a condition that the articulation would not be so deep would predispose to dislocations of the jaw.

The direct causes are due to active muscular contraction during forced opening of the mouth, such as yawning, laughing, vomiting, epileptic attacks, inserting mouth gags for operations in or around the mouth. extraction of teeth, etc.

The indirect causes are due to some form of violence directed to the anterior portion of the lower jaw when the mouth is open which will force the angles of the jaws backward and the condyles forward, the axis of motion being in the region of the bicuspid teeth. This may be caused by a kick from a horse, a blow from the fist, a fall or any other form of violence at this point.

A blow on the side and posterior portion of the mandible may be sufficient to cause unilateral dislocation.

SYMPTOMS.

In bilateral dislocations *(Fig. 94)* the mouth is held open—the patient can open the mouth wider but is unable to close it. Palpation will indicate that the condyles are out of their normal position. The patient will be in considerable pain, such as are felt in cramps, this being due to the contraction of the masseter and temporal muscles. Excitation of the parotid gland due to the spasmodic contraction of the muscles will cause a profuse flowing of the saliva. Deglutition and talking will be difficult.

In unilateral dislocation *(Fig. 95)* of the lower jaw, it will be drawn to one side and the mouth partly open. Palpation will indicate the head of the condyle on one side in front of the articular eminence. A prominence may be seen on the side of the face at this point. There will be considerable pain in an attempt to move the jaw. As in bilateral dislocation, there will be profuse flowing of saliva and deglutition will be attempted with difficulty. The X-ray may be used to determine the character of the dislocation and amount of injury to the contiguous osseous structures.

TREATMENT.

The immediate reduction of a dislocation is very desirable to successful treatment. This usually can be accomplished by pressing downward and backward on the posterior portion of the mandible with the thumb, which should be padded with gauze for protection against the teeth, and at the same time elevating the anterior portion with the fingers. This usually will force the heads of the condyles back over the eminentia articularis into the glenoid fossa.

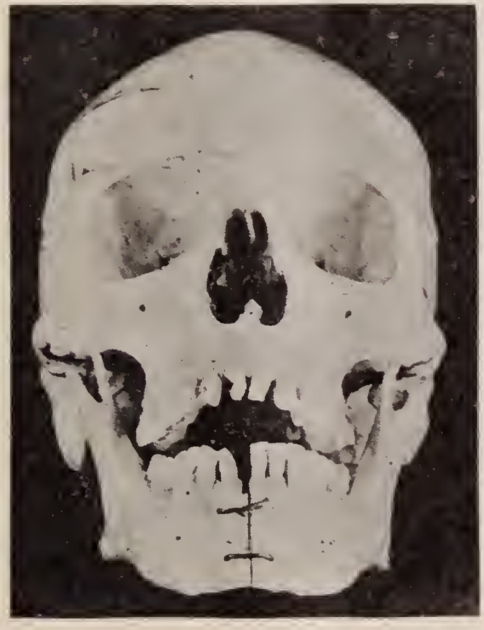

Fig. 94

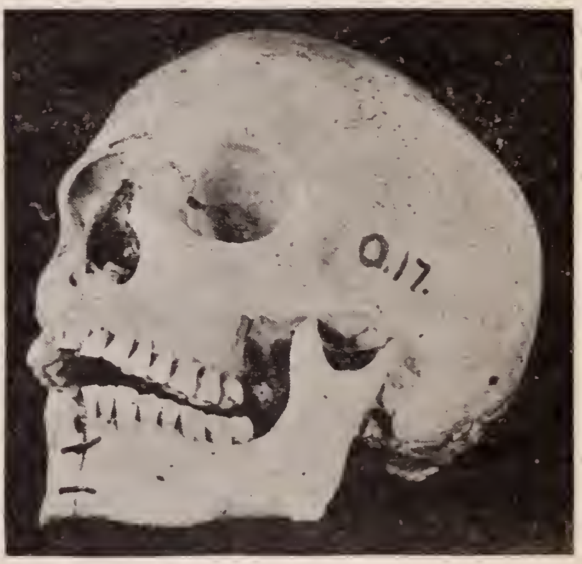

Fig. 95

Another method is to place a small block of wood such as a pencil, between the molar teeth as a fulcrum and force the chin upward and backward with the fingers.

In some obstinate cases an anesthetic may be resorted to in order to relax muscular tension. A few cases have been reported where the coronoid processes of the mandible have become engaged under the malar process and prevented reduction. These cases are extremely rare and can hardly be taken into account in the treatment of dislocations. Usually the head of the coronoid process rests against the inferior surface of the malar process and prevents closure of the mouth.

In unilateral dislocations the treatment described above is applied to the affected side with the additional effort used to free the chin to the mid-line.

After the dislocation has been reduced, the parts should be put at rests for a few days by a figure-of-8 bandage. This will enable the tissues to take on their normal tone. After the removal of the bandage the patient should be cautioned about opening the mouth too wide so as to prevent a repetition of the accident.

Certain obstacles to the reduction of dislocations of the jaw may arise which will greatly interfere with the success of the operation.

In early childhood the pain or fear of pain may make a general anesthetic desirable to successfully complete the reduction. Swelling of the soft parts when reduction is not made immediately may greatly interfere with the reduction. Contraction of the temporal and masseter muscles excited by the traumatism or fear of pain may also complicate the procedure of establishing normal conditions. Here again a general anesthetic may have to be resorted to.

In habitual dislocations of the mandible, the patient soon has no difficulty in making the reduction himself. This is brought about by either a change in the depth of the articulation caused by pathologic changes, or by a loss of tone in the fibres of the capsular ligament.

Genzmer uses pure tinct. iodin .5 to .75 cc. in these cases, by repeated injections into the joint. This he believes will give tenacity to the capsular ligament.

Dubrenil has used a 10% solution of chlorid of zinc in 2 minim doses, with apparent good results. These injections are not attended without considerable pain, prolonged anesthesia of the parts and danger. The author prefers to put the parts at rest by a chin-piece and straps similar to that used, *Fig. 53*, for holding the lower jaw firmly against the upper, thereby putting the parts at rest, when in a short time the tissues will regain their normal tone.

UNREDUCED DISLOCATIONS.

In old dislocations in other parts of the body which have been unreduced, the prognosis is not bad, as the parts become accustomed to their new positions. In dislocations of the mandible which have not been reduced, the movements of the mandible are exceedingly limited, and osseous ankylosis of the jaws is the usual result, this condition coming on *gradually* and without pain or serious disturbance to the patient. The irritation and inflammatory condition produced by the new arrangement seems to set up a metaplasia and the cartligages are gradually transformed into fibro-osseous tissue.

CONGENITAL DISLOCATIONS.

[2]Smith reports a case of an idiot who lived to the age of thirty-eight with congenital dislocation. This was a unilateral dislocation and was a result of defective development of the joint.

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[2] Smith's "Fractures and Dislocations."

(To be Continued.)

CAST GOLD INLAYS.*

BY M. F. BAUCHERT, D.D.S., EL PASO, TEXAS.

IN BRINGING before you today the subject of Cast Gold Inlays, I am treating of a branch of dentistry comparatively new, although its introduction occurred slightly over ten years ago. Papers, demonstrations, arguments, clinics and experiments all have had their turn in demonstrating the technic and procedure of the different operators who have given the casting process their special attention.

I will not attempt to compare the different procedures of others, for you already have seen them demonstrated or read of them in your several dental publications; neither shall I present any re-hash of papers presented heretofore upon the subject, but give you as clearly as possible the methods practiced by me in the daily exercise of my profession. To me the practice of dentistry is a part of my daily life from which I derive a great deal of pleasure; otherwise I could not have made cast gold inlay work a large part of my practice, for I know of no other branch of the profession which requires so much care and precision as the proper preparation of a tooth for the reception of a cast gold inlay, the making of a correct model and the proper insertion and completion of the casting. Of course I am not referring to the old automatic-mallet filling, when the dentist could scarcely straighten out his vertebra after a long and difficult operation; neither could the patient easily close his mouth and arise from the chair; but dentistry as generally practiced today.

I took up the work of gold inlays shortly after its introduction. I attended a meeting of the New Jersey society, held at Asbury Park, N. J., during the summer of 1907, and where I had gone to recuperate from a severe case of typhoid fever; and where a lecture and table clinic were given on the then new invention. I do not remember who the demonstrator was, but I do remember that Percy Russell, who had just consolidated his New York business with that of the Electro Dental Mfg. Co., was at the meeting demonstrating a casting machine he was trying to perfect for the Electro Dental Co. and which evidently was never put on the market, and that shortly afterwards I rode with him upon the train from New York to Philadelphia, when the matter was discussed.

Last Saturday I had my office assistant look back over my records and found that the first cast inlay I inserted was during August, 1908, and was of Klewe's platinum alloy; the first gold inlay I inserted during October of the same year, being cast of an alloy known as Manheim's gold, a formula given me by the Chicago man who came to Mexico selling a casting machine, and from whom I purchased my first casting outfit, which was of the compressor variety, which when well adjusted made a fairly good casting, and when not so adjusted it scattered about 80% of the gold over the laboratory floor.

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*Read before the Southwestern Dental Society, January, 1918.

I had the pleasure during the past year of seeing the first inlay mentioned above in excellent condition in the patient's mouth; I also saw within the past sixty days the first gold inlay mentioned which was in perfect condition still. The Klewe alloy casting I removed by drilling in half, finding the cavity entirely free from decay. The patient had been coming to me off and on for some time, complaining that the tooth was sore and felt that something was the matter with the inlay. After repeatedly examining all margins with a fine explorer I would discharge the patient, telling her that I was certain the inlay was not at fault. Finally through her insistence I removed the inlay by drilling in half, finding the cavity in excellent condition and free from decay. This casting was a disto-proximal-occlusal one and I attribute the long life of the inlay more to the cement used and the insertion into a dry cavity, than any special effort upon my part of the casting process. After removal I thoroughly examined the tooth and surrounding tissue for the cause of the soreness and found just under the gum margin and directly above the cervical border of the inlay cavity, a hard body, which proved to be about three-eighths of an inch of a wooden toothpick which had been broken off under the gum margin, or subsequently worked itself into that position. The patient remembered nothing of the occurrence at the time it happened but the trouble at once disappeared. Upon meeting her husband some few days later he remarked, "my wife certainly has faith in you now although she was beginning to doubt you when you repeatedly told her that there was nothing the matter with her tooth."

It proved to be one of those cases which come to our attention and which we cannot at the time understand.

Returning now to the subject of casting machines. After my first outfit previously mentioned, I purchased the Elgin Vacuum machine and have used it continually since the day of its purchase, and as I have perfectly satisfactory results, I do not care to make any change. When I say perfectly satisfactory results I mean of course results which I feel are as nearly perfect as can be obtained by the present methods. I have argued with myself continually relative to different systems for casting and when it comes to summing up the conclusions derived from the pros and cons, I find the Elgin in the front rank, and in my present paper all my methods and procedures are based upon its use when the casting process is considered. I have my reasons for adopting this machine based upon scientific principles as applied principally through the laws of nature applied in physics and metallurgy, but I will not try to discuss them here, as my object in giving this paper is to present to you my casting methods, if by so doing I can be of some material benefit to my fellow dentists.

My machine is the Elgin. My investment material is the S. S. W. My wax—Kerr Blue Inlay—which I must say is not at present entirely satisfactory, as explained later.

CAVITY PREPARATION.

This is the most important and difficult part of the entire operation; the most severe for the patient and the most tiresome for the dentist. The margins must be perfect, and when your cavity is ready for the taking of the model, all margins of the cavity must be in their finished state, for no change can be made in them without making the inlay absolutely valueless. Changes can be made in the body of the cavity by the careful and able operator, but those changes should not be made near any of the margins, and if by chance your bur should travel where it should not—as happens to all of us at times—cutting away any part of a margin, no matter how small, make a new model and under no circumstances try to remedy the evil, for it will mean a loss of time and failure in the end and a twisted conscience for the operator.

A good patient trusts you; meet him half way.

In preparing a cavity there are times when the caries of the tooth leads into irregular channels, and if we should cut away all this decay before the taking of the wax model, we would not be able to withdraw it from the cavity, and to remove all decay before the taking of the model, at all times would necessitate the useless destruction of tooth structure, or the extra work of filling in the undercuts with cement, for these small leads of decay at times are so small in volume that their removal after the taking of the model is of no consequence as far as the strength of the tooth is concerned.

The safer way is to fill in all these undercuts with cement and then re-form the cavity later and before the taking of the wax model. To do this at all times means a loss of time for the experienced operator. There is no cavity preparation to which applies the saying "Extension for Prevention" as to that for cast inlays; for the prevention in this case is not merely for the prevention of a recurrence of decay, but also for the prevention of the breaking down of your walls surrounding or underlying your inlay, in having undermined them too greatly in the preparation of your cavity and the removal of decay.

Take a careful survey of your diseased tooth and then with a sharp chisel cut away all overhanging enamel which your experience tells you must be removed. Remove this handicap from the beginning, and form in your mind the approximate form of the necessary cavity for the reception of the restoration

In many cases where inlays have fallen out and the cases brought to my attention, I have found at first glance the cause of the failure, which in the majority of cases has been a damp cavity or improperly-formed inlay. The failure due to dampness simply meant that the cavity at the time of the insertien of the inlay had not been properly dried out; or again the dampness resulting from decay having been left in the preparation of the cavity.

If the overhanging enamel of a decayed tooth is not removed sufficiently to see when you have removed all decay, then your work becomes guesswork and uncertain as to its durability.

To make yourself believe that decay has all been removed simply because you cannot see it. is folly, for in the majority of cases where the distal and mesial surfaces are badly decayed, that decay has extended to the very apices of those projecting points of dentin found directly under the cusps. When there is a dark reflection shown through the enamel at those points, the chances are the decay had not all been removed before the setting of the inlay.

Having removed all decay. study your tooth and its walls; see if there are any parts of the tooth too weak to undergo the strain required of it after the insertion of the inlay, and most especially that of pressure which might later be caused by the battering of a too prominent margin of an inlay. When this has been determined. begin the formation of the cavity for the retention of your inlay, filling in the undercuts with cement—if such is indicated—but see that, in all circumstances and under all conditions, your cavity is thoroughly dry before inserting any permanent filling material.

This precaution is more necessary with inlays than with any other class of fillings, because your inlay must be so formed that it enters the cavity freely before being cemented; a damply-cemented inlay means decay and lack of retention.

Avoid burs with decided angles. Inverted cone burs in my opinion never should be used in dentistry in the preparation of cavities. Pear-shaped burs can be used in almost all cases where the form of an inverted cone is indicated.

MAKING OF THE WAX MODEL.

A wax to be used for model making must possess the following characteristics: Be of such consistency as to permit of its manipulation upon heating in the initial formation of the model; at the same time be of sufficient strength and density to permit of its being carved upon cooling without dragging or changing its form; at the same time not be so brittle as to chip off in carving instead of giving a clean cut. Formerly and for many years I used The Ransom & Randolph Standard Wax and thought no other its equal, but finally every time I purchased a new supply it was put up in different form. About eighteen months ago I began the use of the Kerr Blue Inlay Wax. In this wax I found my ideal and in no way could I find any fault with it; its color was such that it permitted carving to a degree of nicety, indicating at all stages where care was necessary as to the thickness of the different parts of your model by the variations in the density of its color. Lo and behold! At the present time I am at sea as to a casting wax, for in the last dozen boxes of this wax which I recently obtained from our dental depot, I find an entirely new wax; so deep in color that you have carved through your wax before the color has warned you of the thinness, and so hard in composition as to be brittle at the temperature to which it cools in the mouth. The wax as formerly made could be formed ideally into the model, but now with large MOD cavities its manipulation is extremely difficult even to an experienced operator, where proximal margins are to be considered, as it hardens too quickly after insertion into the cavity and to such a degree that the proper adjustment to the margins is rendered difficult.

I do not like the re-heating of a wax in the mouth by warmed instruments, although at times I resort to it, but take care that my instruments are not heated sufficiently to melt the wax. I heat my wax over the alcohol or gas flame, causing it to melt and run, but in no case do I attempt to manipulate it until it has been thoroughly heated through and through and then cooled off enough so that when pressed with the fingers it is plastic without cracking or graining. At this point of temperature I calculate approximately the amount necessary to fill the cavity to overflowing, and just before inserting the wax into the cavity, pass it through the flame, melting the outer surface. The instant it cools to the degree at which it will not crack through manipulation, insert it into the prepared cavity and press quickly to place. The outer part being so much softer enters all parts of the cavity, being forced into place by the less plastic and cooler inner portion, causing less distortion and a more concentrated mass. I then have the patient bite into the wax, thereby getting a perfect occlusion, quickly followed by repressing the marginal sections with a suitable instrument so that the wax is pressed into all depressions of the prepared cavity without any chance of rocking, holding the wax tightly in place with my finger during this part of the operation.

Now by the use of appropriate instruments I carve off roughly all surplus margins, avoiding at all times the use of instruments with very sharp edges, excepting when duplicating the natural tooth form as found upon the occlusal surface. If these sharp-edged instruments are used you are very likely to carve clean up to the marginal contacts, which should be avoided if the delicate and closely-fitting inlay is to be the result. For the proximal margins I take a rather fine cuttle fish strip, wide preferred, so as to overlap the margins in place of encroaching upon them as might be the case with narrow strips, resulting in a grooved instead of a smooth and plain surface. I pass this wide strip between the teeth with the grit side toward the wax and then while my assistant presses firmly downward upon the wax, I grip tightly the protruding sides of the strips and pass it back and forth over the proximal surface of the wax with the forces of the strips acting at angles of from 45° to 80° to the plane of the wax surface. In doing this the result is a slightly rounded surface upon this surface of the wax model, and the wax is carried against your margins with absolute accuracy, producing that delicate overlapping of the feather edge of the beveled margins so much desired.

To this I attribute to a great measure the success I have had with my inlays.

In stripping off this surplus wax care must be taken to avoid filling the grit on your strip to overflowing; pass your strip along to unused portions, otherwise your surface will not be smooth but have a grainy appearance with lines across it. During this initial stripping have your strip dry where possible, otherwise it is very likely to buckle. I now take a perfectly plain strip—a strip known as the amalgam strip, which is simply a good grade of tracing cloth—and placing the unglazed side toward the wax surface, draw it back and forth over the surface in the same manner as the previous strip and at the same angles of force, excepting that I permit this strip to become wet from the oral fluids, giving the wax a smoothly-finished surface. In bringing your proximal surfaces to the desired adaptation by the use of these strips there seems to be just enough heat generated by the friction to soften superficially the wax, causing it to adapt itself with perfect accuracy to your tooth margins. After the adaptation of the proximal margins, I carve the occlusal surface, duplicating as nearly as possible the general form of the corresponding natural teeth. For this purpose the S. S. W. No. 33 and 34 scalers are very useful instruments, as the sulci of the tooth can be reproduced very nicely and quickly. In using these instruments I avoid permitting these sharp edges carving away all of the overlapping wax at the marginal points of contact, but trim these away with less sharp instruments as found among those used for plastic fillings. The formation of your wax model is now almost complete; but now comes the part which to me has proven of untold value in obtaining perfect adaptation and the elimination of any ragged edges at the marginal points of contact. I place the tip of my finger in the alcohol flame for a second or so and then quickly pass it to the tooth, and with a massaging movement, massage the margins of the wax, always in the direction of the exposed tooth structure and away from the body of the wax. Your wax model is now practically ready for removal, but to insure that there has been no lengthening out of your model, thereby causing it to rock or draw away from the margins, I generally take one of the plain strips and encircle the tooth, grasping the ends of the strip in the palm of my hand and with the tips of my thumb and index finger of the same hand tightly draw the strip around the tooth, at the same time pressing down upon the wax model with the finger of my other hand. Your adaptation is now perfect and completed, if your technic has been properly followed.

I now take a sprue made from an ordinary bank pin which gauges about .035 of an inch in thickness, and grasp it by one end with small pliers and hold it in the alcohol flame for a few seconds and then insert it into the wax model at a point generally of the most strength. This must be done quickly and steadily as the wax is melted around the sprue, but congeals almost immediately, the pliers carrying away the heat very rapidly from your sprue, the very thing you desire, for in so doing your wax model has not been damaged or changed in any way detrimental to its fit. I generally have my assistant spray water of ordinary temperature upon the pin the moment she notices the wax has flowed around the pin and commenced to congeal, as it means a saving in time to the busy dentist. Now with a steady pull, directly parallel with your sprue, remove your wax model, being extremely careful that from that moment until it has been invested your model does not accidentally come in contact with any object whatsoever, for if it does, the chances are it will be rendered worthless as far as a perfect inlay is concerned.

I now carefully place the free end of my sprue wire into an ordinary jeweler's pin vise of the straight chuck variety, and with a small spoon excavator, perfectly straight excepting the angle at the bowl which should be about 45°, I groove the wax model around its interior surface in all places where retention is desired or suitable and the thickness of the inlay will permit. I have two objects in view when I perform this part of the operation; one being to form anchorage for the cement of my inlay, the other the formation of a thick body of cement near the exterior margins. I have noticed in many inlays which have fallen out, a black line following the outline of the exterior margins at the gingival point of contact with the tooth, indicating that dampness had encroached upon the interior surface of the inlay, either through deterioration of the cement or the inlay having been set without the cavity having been thoroughly dried out or protected against moisture during the insertion of the cement and inlay.

The use of this small spoon excavator forms minute feather edges upon the margins of this groove which are quickly and perfectly removed by passing another spoon excavator of a slightly larger diameter along the groove. Now if there is any surplus wax at the point of the insertion of the sprue wire into the wax model, I remove the same with a sharp instrument, this being the last stage of the operation; to remove it previously simply weakens the hold of the sprue to the model and many times permits your wax to break loose when carving the groove.

Your model is now ready for investment.

Carefully loosen the grip of the vise upon the sprue and with a pair of small-beaked pliers firmly grasp the sprue, removing and inserting it into the conical wax of your crucible former.

At the point of entrance of your sprue wire into the wax, seal the contact with a hot spatula so that upon investing there will be no frail margins of investment material to break off and drop into your mold, thereby ruining perhaps what otherwise would have been a perfect casting.

INVESTING THE MODEL.

I take a small rubber bowl, placing in the same slightly more water than I judge necessary for the mix, adding thereto in loose form the investment material, also slightly less in quantity than enough to take up the water. When the same has become permeated with the water, thereby expelling the air held within, I pour off the surplus water and thoroughly mix to bring to a homogeneous mass, expelling as far as possible all remaining air bubbles. I then strike the bowl upon the bench several hard and quick blows to bring to the surface any minute air globules or pockets. At this stage the mix should be of a consistency that it can be barely poured from the bowl with slight shaking. Avoid either too thick or too thin a mix, as I find that ofttimes either will result in a cracked investment. Having placed the inlay ring upon a glass slab, I pour the investment material into this ring, exactly opposite to the manufacturers' instructions, filling the same to the brim. Then after holding my wax model for a few seconds in a stream of water from a faucet, which will cause the investment material to more readily take hold, I take a small camel's hair brush and dip the same into water and then into the remaining investment material in the rubber bowl and with a stippling movement paint it over my wax model. At first the investment does not readily adhere, but in a few seconds it will take hold and you can entirely envelop your model, care being taken not to have permitted any pockets to form during the operation. I then insert this wax model into the investment in the ring, lowering the same also with a stippling motion until it has completely sunk into the investment and the face of the crucible former in contact with it I then press it to its desired depth and leave it for setting, which as a rule takes no less than half an hour. From this time on I do not take into consideration the passage of time within reasonable limits. If I care to leave it until the next day I do so and find no appreciable difference in my casting. From this point on all the work of drying out, initial heating before casting, cooling and subsequent casting, I leave to my office assistant; nevertheless this part of the operation in some respects is highly important, and I will explain some of the more important points. To remove the crucible former I hold the top a few seconds in the flame, but not long enough to melt the soft wax of the crucible former (never use hard or base-plate wax or modeling compound) and then I pry off the crucible former with my thumb nail. the former generally coming off with all the soft wax, leaving a perfectly clean sprue in the investment. I then take a pair of pliers which I have for the purpose, and place their beaks into a Bunsen flame, heating them rapidly, then grasp firmly the projecting pin, retaining the hold until the heat from the pliers has transmitted the heat through the pin to the invested wax model and sufficiently for it to be softened at the point of its contact with the sprue. I then carefully revolve the pin to loosen the hold of the investment upon it and withdraw the same, leaving the hole leading to the model perfectly smooth and free from any projecting material. Sprues made from the bank pins as mentioned are brass, nickel dipped and highly polished. When you cut the pins into sprues, slightly round off the ends upon a fine wheel in your lathe or with a disc in your engine.

DRYING OUT THE MOLD.

I now place the ring with the invested mold upon its side over a low flame inside of the closed half of an ordinary plate flask, placing the flame so that it strikes the bottom of the flask to one side of the place over which the ring is placed so as not to get too much heat at the beginning. In doing this the initial heating is very gradual, giving ample time for the investment to give up its surplus moisture and in this way there will be the least possible distortion of your mold.

If quickly heated up I find that the mold contracts and cracks with some forms of castings, and the gold at times is cast into the minute crevices.

I allow about an hour to pass for this initial heating if the castings are simple occlusal ones, and not too large; but with large proximal and MOD castings about two hours are consumed. The ring is turned partly around from time to time. After this initial heating the flame is turned on so that the entire bottom of the flask is covered and the flame creeps up around the edges; leaving it about two hours longer as a minimum at this temperature, revolving the ring from time to time to equalize the drying-out process. After the minimum time has passed I pay very little attention to the time and have left them as long as an entire day and obtained perfect castings.

If the initial heating is carried out carefully, I do not believe that any subsequent heating affects them in the least, excepting that it betters them in the case of very large castings. Of course excessive high heats are not taken into consideration in my statements.

When I am ready to cast, I place the ring into an asbestos block retained for this sole purpose. If it is a block in which borax has been used in melting gold, etc., and any part of the borax attaches itself to the planed end of your casting ring, you will destroy its adaptation to the receptacle and make a failure of your casting, for perfect adaptation is necessary with the vacuum system. The large flame of the blowpipe is now thrown upon the entire ring, enveloping it completely, but taking care to heat gradually and evenly, revolving the ring from time to time. I continue this operation until a cherry red shows through the sprue hole, then cut off my flame and leave the ring in the investment block until it is practically cold.

THE CASTING PROCESS.

When the invested ring is cold I place it into the receptacle of the casting machine from which the air has been removed, then open the valve and see if the adaptation of the ring is perfect and air does not rush in except through the investment.

I now place my pure gold button in the crucible and heat as quickly as possible with the hottest flame (not a small pin flame) until the gold has melted and passed into the white dancing stage, when I open the valve and the gold is cast.

During this operation the investment directly surrounding the model cavity has not been heated sufficiently to retard the congealing of the melted gold almost immediately upon its contact with the investment. I believe upon this hinges a good part of the control which I feel I have mastered in reducing the contraction of the gold to the minimum, and the only contraction which takes place after the congelation of the gold is that which is natural to the gold itself, and which takes place between the temperatures of the gold when cold and the point reached just before its fusion, which contraction is so small as to be practically nil as affecting the fit of an inlay. Even to try to control this contraction in pure gold would simply be an attempt at changing the laws of nature, which I do not believe any of us would feel like attempting.

My greatest results have been obtained in controlling contraction, since I realized that there are two distinct contraction stages; the stage between the molten gold and the congealed gold when it is at its highest temperature immediately after the congelation process has taken place, and the stage between this last temperature and when it is cold. In the first instance the contraction taking place is enormous, while with the latter it is extremely small. The former we can control as far as its effect upon the diameter of our casting is concerned, but with the latter our efforts are in vain. With the methods I have adopted and in many cases originated, the longitudinal contraction of the gold casting in MOD. cavities during the second stage is in almost all cases a benefit instead of a detriment to the fit of the inlay.

If upon removing the casting from its investment, a perfect inlay has been obtained, quite a large hole is generally found in the casting immediately adjacent to the point of junction of the sprue wire and the wax model; the larger the hole in comparison with the size of the casting, the more perfectly fitting will be your inlay, showing that the contraction taking place during the congealing stage has been more perfectly controlled. This is based upon the laws of nature as applied in physics.

Now on the other hand the presence of this hole does not mean that your contraction affecting your casting has been controlled, for this hole can also be produced from other causes and represent a part of the congealing contraction taking place also in your button or surplus gold. Right here is where the principles of the pressure and centrifugal machines are at fault according to my deductions.

This hole can be readily and easily filled by first placing a little borated water into it with a pointed instrument and then heated to the fusing point of the borax, then filling the hole with either small pieces or filings of 22K solder. If you fail to heat the borax as stated, the chances are that the solder will be thrown out of the hole upon heating and flow into places where it is not desired. An adustable Bunsen flame should be used and the flame selected large and entirely blue, although not of the blow-pipe or regular Bunsen type and being more or less equally hot at all points, thereby avoiding the possible fusing of your delicate margins. Place immediately the hot casting into dilute sulphuric acid and in doing so be careful not to injure your margins; if possible use iridio-platinum pointed tweezers which you can make, for if steel ones are used and they touch the acid, the probabilities are that your inlay will take on an iron stain, giving it a most undesirable color, which, however, can be removed by re-heating your casting to a red heat and again immersing it into the same acid, avoiding touching the acid again with your tweezers, which should have been entirely freed from the acid by washing in water before using the second time.

If any of the investment clings to the casting after washing with a stiff brush, by re-heating and immersing in the acid and repeating the operation you will generally remove the remaining investment or at least render it so that it can be easily washed off.

I do not like the use in open containers of such acids as hydrochloric—known as the most allaround acid,—neither nitric, for their fumes are very disagreeable and attack very readily any metals or nickeling in their vicinity. Neither do I like hydrofluoric with which the investment is most readily removed, as it must be kept in wax, gutta-percha or leaden bottles and its fumes attack glass and the porcelains, and a burn from it heals with difficulty.

Now examine your casting for minute globules of gold upon both the interior and exterior surfaces and if found the former easily can be removed by a spoon excavator and the latter with a sharp chisel. These small cast globules are very small and can almost entirely be avoided if you are careful when investing your model to see that your investment is free from air globules and none formed during the investing process; nevertheless they are of no consequence and in no way interfere with the fit of the inlay if carefully removed. The large round lumps cast upon the inlays are either the result of a faulty investing technic or carelessness upon the part of the operator.

THE ADAPTATION OF THE INLAY TO THE CAVITY.

I now cut off with wedge cutting pliers the inlay from the button, leaving about one-eighth of an inch of the gold sprue casting still attached to the inlay, to serve as a hold when trying in the casting, which should fit at first trial, but make sure that it is properly seated. I take two blunt-pointed, long-handled instruments, placing one at a central point of the inlay and have my assistant strike this instrument a few sharp blows with a loaded gold mallet, having placed the other instrument at some other point on the inlay to serve in holding it down for the initial seating. I now hold the inlay down with the first instrument without removing or changing its position on the inlay, then place the point of the second instrument alternately upon different projections or wings of the inlay and each time having it struck a few light blows. You always can tell when the inlay is perfectly seated by the character of the effects of the blows. In doing this all rocking is eliminated if any previously existed, and the casting perfectly seated. This operation also flattens out any microscopical globules or raised margins caused by the carving of the retention grooves.

In case of large MOD castings I place an instrument upon each of the occlusal-proximal margins, inclining the instruments at such angles that the force of the blows will be directed toward the body of the tooth, holding down upon both instruments while each are consecutively struck a few light blows. This as a rule seats your casting in a satisfactory manner.

I now cut off the remaining part of the casting caused by the sprue hole with wedge cutting pliers and remove the slight prominence remaining with a suitable plug finishing bur, wet. These burs will if properly used, smoothly and quickly remove any surplus gold without jerking the casting out of your grasp and perhaps ruin your delicate margins as ordinary burs will do. Carborundum stones I do not like as they immediately clog up with the gold, rendering them unfit for the operation.

I now examine my cavity carefully to see if there are any remaining points of decay, either accidentally overlooked, or intentionally left in order to avoid undercuts. If so they are removed.

In case the cavity is one in which the floor has been covered or the undercuts filled in with cement, I take a round bur of suitable diameter and bur off a slight layer of the cement to remove any film or deposit which might have collected or formed, and also form a groove in it corresponding as nearly as possible to that carved in the casting. These two procedures render the surface clean for the adhesion of the cement and a retention for the inlay.

I place the casting in pure alcohol and remove with my operating pliers, placing it in the flame of the alcohol lamp to ignite; then remove and permit the alcohol to burn off.

After this I do not touch the casting with anything but the pliers.

I dry out my cavity thoroughly and see that there are absolutely no damp margins, while my assistant is mixing the cement. When the mix is ready and at the proper consistency I take hold of the inlay with my pliers and slide it along the mixing slab into the mass of cement, repeatedly withdrawing it until the cavity surface of the inlay is thoroughly coated. In performing this operation all danger of air pockets is eliminated. I then take a small ball burnisher and with it carry a suitable amount of cement into the cavity, inserting from one side and gradually work it along the walls first, in order to avoid forming any air pockets, continuing until the entire surface of the cavity is covered. I then grasp my inlay with my pliers and carry it to its proper position, then press into place and seat with the aid of the mallet if thought necessary.

If for any reason your inlay has a tendency to rise when the pressure upon it is released, quickly remove it and do not attempt to remedy the error, for an air pocket has been formed and your cement at this stage is unfit for remanipulation and you will only court failure in trying to remedy your evil. After removing wash the cement from the casting immediately and remove the fresh cement from the cavity of your tooth and repeat your operation from the first, as I have described. If you are not able to use cotton rolls or napkins with absolute certainty, resort to the rubber dam, but under no circumstances take any chances of subsequent failure through the insertion of your inlay into a cavity where any part of its surface contains moisture, as most failures can be traced to this as a primary cause, when not due to a faulty casting.

The cemented inlay is now left a few minutes with its margins covered with the surplus cement until the initial setting has taken place, then this surplus is removed. It is a good practice to leave the inlays until a future sitting for the final finishing. If the technic which I have given you has been faithfully followed there will be microscopical margins of cement only following the outline of your inlay, the removal of which is easily and quickly accomplished, as I will now explain.

FINISHING.

When your patient returns, your inlay is such that any force whatsoever necessary for its completion can be exerted without any danger of the inlay's removal. I now take an ordinary scaling instrument which has a V-shaped converging point and pass it around the margins of the inlay, removing all the fine margins of cement which are exposed to view. This operation also will remove the fine margin not visible to the naked eye.

You can now say that your inlay has a microscopical overhanging of the margins at their line of contact with the exposed tooth structure, and this margin can easily be burnished into place by a suitable instrument, thereby sealing completely any access of moisture to your enclosed cement, this being the final treatment which contributes greatly to the life of your inlay.

I now finish the surface of my inlay with plug finishing burs, and when working on the margins always have the working contact of the bur revolving outwardly, as these burs act both as burnishers and cutters in their operation. They can be run backward with almost equal efficiency.

I never use stones because they cut your tooth enamel with more ease than they do the gold; where with the plug finishing burs the enamel is damaged in no way, as the burs cut the gold very readily and evenly, but when arriving in contact with the enamel they refuse to cut it and you can tell immediately by the touch when this stage has been reached; these burs act also as burnishers in carrying the gold over and sealing the margins.

STUDIES IN PLASTER AND VULCANITE.*

BY STEWART J. SPENCE, CHATTANOOGA, TENN.

IN SAN FRANCISCO, about the year 1883, I began experimenting with plaster of Paris with a view to preventing its expansion while setting. All I then discovered was that thin mixing and short stirring led to the least expansion. I could not prevent all expansion. That was disappointing. But I noticed that when mixes set slowly their expansion was least, "and thereby hangs a tale."

Many years later, I think it was in 1901, I noticed one day that a certain mix of plaster set slowly, and in casting around for the cause of this unusual occurrence I remembered that I had thrown a certain chemical into the bowl of water from which I had taken the water for this mix, and then, on connecting this fact with the previous discovery that slow setting tends to lessen expansion, it occurred to me that a mix made with this chemical as an ingredient might result in a non-expanded cast. It did so, when tried. It required, however, for perfect non-expansion much more of the chemical than in the first case, so much so, in fact, that it set very slowly; I think it was in about twelve hours.

But I had discovered non-expansion. I had made a triumph. I felt a little like the Count of Monte Cristo when he, after finding the immense treasure in the mountain cave, waded out into the sea, crying, "The world is mine!" I should have no more loose plates! No more hear that terrible complaint, "Doctor, I can't do nuthin' with these teeth of yours. You've got to make 'em over again. They won't stay up." Like Archimedes, I shouted "Eureka!"

But I soon found that I had hallooed before I was out of the wood, and that the old Greek who said, "Art is long," told a sad truth. My next plates did not stick as tight as I had expected they would; something was wrong. And then, it was impossible to take the impression with a plaster which required all day to set. And if, I argued, I should add anything to hasten setting, this would react by causing expansion; for had not my San Francisco experiments proved that quick setting is accompanied with increased expansion? Nevertheless, I went to experimenting, though despairingly, to find a remedy for this evil of slow setting, and again I scored a triumph. Quite contrary to my expectation, a certain thing gave quick setting without expansion. In experimenting, it is often the unexpected that happens.

But, alas, art is long; the plates would not cleave to the roof of the mouth like barnacles to a ship's keel, as I had supposed they would.

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* Read before the New Mexico State Dental Society, June 22, 1918.

Something was wrong. What was it? I lay awake nights wondering. My spirit could not rest. Instead of finding a Monte Cristo treasure, had I been merely chasing a bag of gold at the end of a rainbow? What was wrong? Could it be that the cast lost shape in flask-closing? Oh, no! How could so soft a material as unvulcanized rubber crush so hard a substance as a plaster cast? Impossible! And yet I remembered that in my San Francisco days I had noticed with surprise that a lump of celluloid, though at boiling heat, deeply indented plaster. Was it possible that heated rubber would act somewhat similarly? Well, let me put it to the test; it is the unexpected that happens. So I tested it, filling the two sections of a vulcanizing flask with plaster, separated them, and placed a chunk of red rubber between them, and closed in hot water. Now, if the rubber will all ooze out at the edges when the flask is closed, as it would from between two planes of iron, it is thereby proved that plaster does not yield under pressure. Well, that rubber didn't show itself at the edges at all! Ne'er an ooze! It just sunk a bed for itself in the plaster. The unexpected had happened. Strange! What could be the reason? I thought and thought and thought, and at last it dawned on my slow and dull understanding that soft rubber under compression is no longer soft but becomes hardened by the pressure.

And so here was another problem,—another stubborn fact; the plaster cast loses shape in flask-closing. What could be done about it? It occurred to me that perhaps the flask was closed before the heat had had time to penetrate through the plaster to the rubber, seeing that plaster is a poor conductor of heat. Therefore, to find out how long it takes for boiling water to reach the center of a flaskful of plaster, I made a hole through the lid of a flask and inserted a thermometer in the plaster. I found that 212 degrees were reached in about fifteen minutes. But though thus raised to the greatest heat ordinarily possible, the compressed rubber was too hard for the plaster. Dry heat was unsatisfactory; with it the thermometer would not reach 212 degrees till all the moisture was evaporated, which took a long time, and then the mercury would shoot up to three or four hundred degrees in a short time. The softening of the rubber by solvents was next tried. Coal oil (which, by the way, is also a solvent of Modeling Compound and can be used for removing the particles of this substance which stick to casts), dissolved the rubber very nicely, making it ooze out at the edges of the flask quite freely; but, alas, it ruined the vulcanite. Other solvents acted similarly. Chloroform would not ruin the vulcanite if given about a day to evaporate from the rubber before vulcanization, but when it was evaporated, the rubber was hard again.

Of course, to harden the cast would serve as well as to soften the rubber, but I saw no way by which this could be done. At least, so I thought until one day after a long stirring of a mix (done to get quick setting), I noticed that this plaster when set was somewhat harder than usual. Why this? If long stirring would give hardness, keep on stirring. So I stirred good and long, until one day it dawned upon my slow mind that perhaps it was not the stirring itself which gave the better hardness, but that the long stirring caused the mix to slack and thus permitted a little more dry plaster being added and thus caused a more solid cast. I had been blinded to this evident fact by some experiments in plaster of Paris made in the San Francisco days which seemed to show that a very stiff mix of plaster set no harder than a moderately stiff mix. But now, when I kept on adding dry plaster, and stirring until the mix became too stiff to further stir, and got a much harder cast thereby, the reason of it was clear and simple. Why didn't I think of it before? It was as easy now to understand as was Columbus' balancing the egg on its end. How slow we are to discover the simple truths of Nature! As said Longfellow:

Art is long, and time is fleeting;
And our heads, so thick and brave,
Need, like muffled drums, a beating
To jar loose their grey matter and make them do a little straight thinking while on their funeral marches to the grave.

Well, I mixed the mixes thicker and thicker, working into them as much dry plaster as would stir, and thus getting fairly hard casts. But in doing this I would sometimes get in more plaster than could be stirred, which necessitated more water, until one day I stumbled on the idea of taking the crumbly mix in my hands and working it as putty is worked to mix the oil with it. This was an inspiration.—another triumph. In a minute or two the harsh and crumbly mass became soft and ductile and puttylike. It would even let me dip it into the dry plaster to get a little more hardness.

This gave a hard cast which would not appreciably compress in flask-closing. But still the end was not yet. Fits were better, but not ideal. O dear, what can the matter be? Instead of feeling like Archimedes or the Count of Monte Cristo, I felt something like Tantalus when commencing once more to roll that great stone up the mountain.

But memory came to my help. I remembered that in my early days of dentistry, when I was practicing in a little gold-mining town in California, a plate came out of the vulcanizer cracked through at the palate, and with the investment almost mushy. This remembered incident led me to suspect that vulcanite contracts in cooling, that it was in its effort to contract that one side of that plate broke away from the other side, which latter was, perhaps, a little more firmly held by the plaster investment. Up to this time, though using my improved plaster for the cast, I had been using plaster of Paris for the rest of the investment. This permitted the lingual surfaces of both upper and lower plates to be drawn tonguewards by contraction of the vulcanite. And if one side of the ridge was held more firmly than the other, the latter would do the contracting, thus causing warpage. Experiments proved that this actually occurred. Therefore I invested all lingual surfaces, together with the occlusal surfaces of teeth, with my new hard plaster, thus scoring another triumph.

I found also that over-large plates could be shrunk to a better fit by immersion in hot water.

After that I had good sailing; but one day I was called on to make partial upper and lower plates for a good old preacher who insisted on retaining two or three teeth in each arch, and they almost an inch long. The plates therefore were very thick, and their loose fits grieved my spirit. Here was another problem. It had not occurred to me until then that if vulcanite contracts in the breadth of a plate it also contracts in its thickness, and that in a plate a quarter of an inch or more thick, this contraction might be enough to injure the adaptation. Breadth contraction was checked by the investment of my plaster, but what was there to prevent shrinking away from the cast vertically?

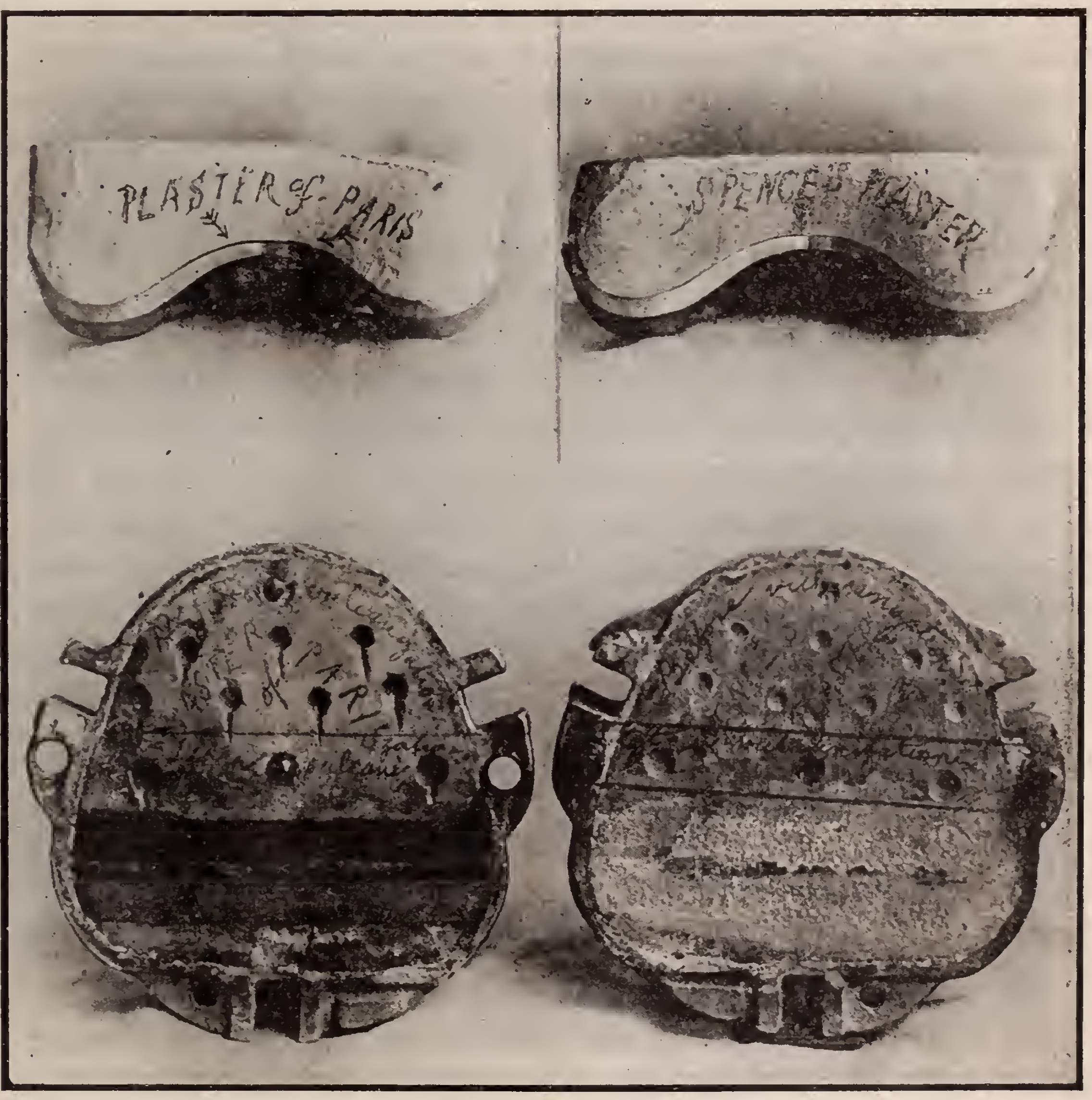
I will not burden you with the many clumsy methods I tried for preventing this contraction of the thickness of a plate, but I will make a long story short by saying that I found in aluminum bronze, when incorporated with vulcanizable rubber in about the proportion of 30 per cent. of the powder to 70 of the rubber, by weight, a preventive of both shrinkage and porosity. My vanity led me to call this compound Spence's Non-contracting Rubber, but it is not patented, nor on the market, and may be made easily by any dentist thus: Between layers of sheet rubber, sandwich the aluminum powder, in a mortar or common cup, then pour in enough chloroform to cover the rubber, giving it half an hour to soak, then work it with a pestle, or any suitable substitute, until thoroughly mixed. Before using, let the chloroform evaporate. Of course this rubber is meant only to fill in thick parts of plates, where brittleness does not count for much. With black rubber, it gives a pretty gold-dust appearance.

Here ends the story of my discoveries in plaster and vulcanite. Since I published them, about fifteen years ago, neither myself nor any other investigator has added anything of importance to them. Much has been said and done in other lines of prosthesis, especially in impression taking and in the shape and arrangement of teeth, but my findings seem to be the alpha and omega of the subjects they treated.

And now a few words in explanation of the exhibits.

These exhibits are made, as you see, in a common tray and a vulcanizing flask. In the tray are shown two things,—the expansion of plaster of Paris and the non-expansion of Spence's Plaster. In the flask are shown four things,—the superior hardness of Spence's Plaster over plaster of Paris both before and after vulcanization, and the contraction of vulcanite and the non-contraction of aluminumized rubber.

To amplify: I contend that no better machine than the common tray can be made for testing the expansion of plaster of Paris. Both myself, and others after me, have made more complicated machines.



Note.—The illustrations fail to show the shrinkage and non-shrinkage, respectively, of the vulcanite strips.

When plaster of Paris is poured into a tray to set, three things occur: First, the impression or cast is widened outward by expansion, so that, as you see, after it has been removed from the tray it will not go fully back thence; second, the resistance offered by the flanges of the tray prevent to a degree the lateral expansion, even as the walls of a vulcanizing flask prevent expansion; third, in the effort of the plaster to expand despite this resistance, it bows up at the palatal dome. With very high palates, the greater expansion vertically of the thick plaster over the ridge than of the thin plaster over the palate, also increases the evil. In the plaster of Paris exhibit you can see quite a space between tray and cast at the palatal dome, whereas the cast made of Spence's Plaster, as you see, has no such space.

Now for the flask exhibit. The lower section of the flask was filled with plaster of Paris, and the upper, with Spence's Plaster. These were given twenty-four hours to harden. Then a small steel ball was placed between the two sections, and they were brought together by screw pressure. This was repeated several times. As you see, the ball was forced about fourfold deeper into the plaster of Paris than into the Spence's Plaster. The ducts running out of these holes, which makes them look like a school of tadpoles, are no part of the demonstration, but were necessitated by my having to get under the ball to pry it out of the plaster. You observe that the ball is left in the last-made hole. The case was then vulcanized, and the relative hardness of the two plasters is shown by the three holes made by the large ball, which also is left *in situ*. As you see, the ball sank into the plaster of Paris at least two-thirds deeper than into the other plaster. This shows sufficient hardness to prevent contraction of vulcanite during cooling. The third test is shown by the contraction of the strip of maroon vulcanite, reaching, except for its shrinkage, across the flask, and the non-contraction of the vulcanite in which is the aluminum bronze. It must not be thought, however, that the maroon strip contracted that much during its first vulcanization. No, its investment would prevent that. It was, together with the other strip, removed from its investment and then re-vulcanized.

Gentlemen,—all of you who are not asleep by this time,—with many apologies for the length of this paper, I beg to present to you my best wishes for your future welfare, and especially that you may never again hear those paralyzing words: "Doctor, that plate of yours won't stay up! You've got to make it over again!"

DISCUSSION

Dr. C. H. Woolgar, Magdalena, New Mexico: We have today the pleasure of listening to the reading of a paper of unusual interest about plaster of Paris, as used by dentists, written by one who has devoted a great deal of study and labor on the subject.

Dr. Spence's adventure in the West (and who knows what that means better than some of us here in New Mexico) and the evolution of the Spence's Plaster of Paris is a bit of interesting history.

That which is of special interest to us are the practical suggestions that will be helpful in our plate work, save us from hearing those paralyzing words: "Doctor, that plate of yours won't stay up! You've got to make it over again!" I do not say if we heed Dr. Spence's paper that it will save us work; we put more work on our artificial dentures than ever in the history of prosthesis, but it will give us better results.

Plaster of Paris changes shape during the time of crystallization, which destroys its accuracy. How many of us thought it was as much as this exhibit shows?

Dr. Spence has brought to our attention the necessity for an unyielding cast to vulcanize on. If the cast yields to the pressure of the rubber during the time of vulcanizing, perfect adaptation of the denture to the jaw will not be secured, and our efforts at procuring a perfect cast of the jaw have been thwarted. Spence's Plaster, if properly mixed, produces a cast unyielding to vulcanizing rubber; if carelessly mixed is no better than plaster of Paris.

Up to very recently I have used plaster of Paris for investment in flasking. By using Spence's Plaster results have been better. Spence's Plaster should not come in contact with the vulcanite rubber during vulcanizing; to prevent this the cast is covered with tin foil to prevent the investment coming in contact with the rubber while vulcanizing. After the cast is invested in the lower half of the flask, I mix some plaster of Paris thin and with stencil brush apply one or two coats of plaster of Paris to the wax and teeth, being careful to force the plaster of Paris into the interdental spaces. If not given special attention, the plaster of Paris will not fill full all the interdental spaces, leaving small air chambers that will fill with rubber during vulcanizing, requiring extra work in finishing the denture. As soon as the plaster has partially hardened, Spence's plaster investment can be placed in the upper half of the flask.

According to Dr. Spence, that old controversy—which are we to use, dry or moist heat in flasking rubber—has been settled in favor of moist heat.

I am glad Dr. Spence related his experience with long stirring of a mix of plaster, thereby producing a harder plaster. He calls the change that takes place when slowly adding and thoroughly mixing plaster with water, "slacking." This word he borrows from workmen in cement and lime, who by ages of experience have learned that best results were obtained by long stirring, adding the cement or lime slowly. In dentistry the same law holds good in mixing dental elements, pure plaster of Paris or compounds containing plaster of Paris.

You will notice, according to the exhibit, that Dr. Spence has devoted some time and study to changes that take place in vulcanizing rubber. The bar of maroon rubber shows a decided contraction in the length, a much less contraction might thwart perfect adaptation of an otherwise perfect denture. More knowledge about vulcanite ought to be very useful to the prosthetists.

"Proofs," the animated little house-organ of the Lee S. Smith & Sons Co., was a year old in September. We congratulate the dental trade and the publishers on its continued helpful existence.

Northeastern Dental Association

The Twenty-fourth Annual Meeting of the Northeastern Rhode Island Dental Association will be held at the Narragansett Hotel, Providence, R. I., on October 10th, 11th, 12th, 1918.

Alvin A. Hunt, *Secretary.*

THE SURGICAL TREATMENT OF PERIODONTACLASIA.*

BY CARL D. LUCAS, D.D.S., INDIANAPOLIS, IND.

THE DESTRUCTION of the tissues immediately surrounding the roots of teeth is predisposed by a local irritant or irritants, which lower the resistance of the supporting peridental membrane, thereby rendering the tissue susceptible to infection by the omnipresent mouth flora.

The vital peridental fibers which support a normal, healthy tooth are attached to the cementum of the root in the lamellæ of the calcified cementum.

During the functions of the tooth it is evident that the fibers of the peridental membrane undergo a constant readjustment in their attachment to the root, through the activities of the cementoblasts in their deposition of new layers of cementum, into which the fibers are fixed.

For this reattachment to occur, the vital cementoblasts must lie in direct physiological contact with the surface of the root which is free from mechanical and chemical irritants.

Therefore, the first logical hypothesis to be considered in the treatment of periodontaclasia is the surgical removal of the precipitated irritant from the surface of the cementum, and the curettage of the devitalized remnants of necrotic organic pabulum of peridental fibers from the laminæ of the cementum.

If the cementum has been bathed in pus for a long period of time, it may be so thoroughly saturated with toxins that the cementoblasts cannot lie in contact with it and perform their physiological function.

Such teeth may be retained by the use of splints, but the writer questions the advisability of the retention of loose teeth which are denuded of their peridental membrane to or beyond their apical third, for the physical welfare of the patient should be the first consideration in every case of periodontaclasia and the treatment of all cases of oral foci of infection.

After the extraction of teeth which it was deemed unwise to attempt to retain, we have found an extensive localized area of bone absorption, and the pocket thus formed filled with a low grade, mucoid, infected, granulated connective tissue, pyogenous in its origin.

We seriously doubt the ability of the most skilled periodontist in his efforts to eradicate these foci of infection, either by surgical technic or therapeutic treatment.

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* Read before the Four State Post-Graduate School, New Orleans, and the Ohio State Dental Society.

This pyogenous tissue, if surgically curetted under aseptic precautions, when placed in culture media and incubated, will produce a positive culture of streptococci.

We have learned that therapeutics will not cure the blind abscess from which we can grow streptococci upon culture media, and are pretty generally agreed that either surgical curettement, after extraction, or root resection and curettement of the infected crypt, are the only positive procedures for the eradication of the infection of chronically-abscessed teeth, whose root apices are denuded of their peridental membrane, and surrounded by pyogenous granulæ.

If this hypothesis is to be accepted we logically must conclude that tooth roots which are denuded of their peridental membrane to their apical third, their cementum consequently etched by the pus in which they are constantly bathed, and the necrosis of the alveolus leaving an area filled with infected granulation tissue, is curable only by the removal of the irritant—the etched cementum upon which is deposited calcic salts—plus the curettage of the pyogenous tissue in the area formed by osseous necrosis, produced by the chronic, traumatic, septic inflammation.

Incipient periodontaclasia and perhaps the milder degrees of the chronic condition are positively curable, but we question very seriously the advisability of even attempting the treatment of the more advanced cases of the chronic condition which have advanced to the state of extreme looseness of the teeth and copious flow of virulent pus.

Primarily, the function of the periodontist is the conservation of the affected teeth; but we must not overestimate our ability to eradicate all stages of this infection, thereby jeopardizing the health of the patient.

Before beginning the treatment of an aggravated case of periodontaclasia, the teeth should be radiographed and a careful diagnosis made by an interpretation of the film negatives and the results of the radiographic examination carefully recorded for future reference.

If the radiograms indicate extensive dissolution of the alveolar process and detachment of the periodontal tissues to the apical third of the roots, and the affected teeth are so unstable that a splint is required for their retention, we would advise the extraction of such teeth, under aseptic surgical precautions, and a definite curettage of the pyogenous tissues.

The surgical treatment of these aggravated cases will check the progress of the disease, and the teeth, even in the last stage of the condition, can be rendered comfortable and useful to the patient for years; but by preserving them, we are also preserving oral foci of infection, which will manifest itself in such sequelæ as endocarditis lenta, arthritis, neuritis, acne, iritis, and other conditions indicative of metastatic infection.

Many methods of technic and a varied and extensive instrumentaria have been offered by different periodontists, and possibly each of the methods and sets of instruments are efficacious in the hands of their sponsors, for the personal equation enters very largely into all surgical procedures. However, the first issue we shall insist upon is surgical cleanliness in any method or technic for the removal of calculus.

Primarily we are dealing with infection, and to preclude the introduction of extraneous infection, which would jeopardize the ultimate result, we must follow definite rules of surgical technic.

Therefore the mouth, each interproximal space, the teeth, all surfaces of fixed crowns and bridges, each infected pocket and the gums should be thoroughly and copiously irrigated with a warm physiologic saline solution, thereby washing the suspended food debris, mouth flora and loosely-precipitated mucous plaques from the oral cavity, before beginning instrumentation.

We would protest against the use of high-pressure atomizers, containing any of the so-called antiseptic solutions in any strength, as sprays for the irrigation of the infected pockets.

The tissue in these pockets is already in low resistance on account of the trauma produced by occlusion upon the affected teeth, upon the cementum of which is deposited rough nodules of calculus.

The most careful operator in his most conscientious efforts in surgical treatment will traumatize the infected tissue in his attempt to remove the deposits, and a high-pressure spray, directed into these pockets, will not only farther traumatize the infected tissues, but will force the infection more deeply into the tissues.

A gentle, copious irrigation with a warm physiologic saline solution, directed into the pockets with a small sterile glass tube, will not traumatize, nor force the infected material into the tissues; and the warm saline solution will stimulate the soft tissues, producing hyperæmia, and thereby promote healing.

A one-quart sterile metal fountain syringe, suspended two feet above the field of operation, with a sterile glass nozzle the size of the glass point of an eye dropper, fixed in the end of sterile rubber tubing, are the instruments employed for directing the irrigation.

Following the irrigation the preliminary scaling should be done, irrigating the tissues as directed after each treatment.

From two to ten treatments are necessary for the removal of the precipitate *in situ;* then the crowns and necks of all the teeth in both arches should be thoroughly polished upon all their surfaces.

Before instituting this treatment, properly-shaped brushes should be prescribed for the patient, and perhaps a demonstration by the operator of their proper manipulation as well as explicit instructions as to their uses should be given the patient, and a rigid discipline outlined and insisted upon in regard to the personal application of the principles of mouth hygiene.

After the mouth has been rendered generally clean we are ready to begin a definite surgical technic for the removal of deeply-seated deposits.

PREPARATION OF OPERATOR AND PATIENT.

After thoroughly scrubbing the hands and bathing them in a ten per cent. Lysol, or one to one thousand bichlorid of mercury solution and rinsing them in seventy per cent. alcohol, the operator should be clothed in a sterile gown. The patient should be draped with a sterile sheet which covers the clothing and chair arms, and a sterile towel fixed completely covering the headrest.

Then a sterile towel should be adjusted around the patient's head, covering the hair, and the patient's face sponged with a seventy per cent. alcohol solution before surgical scaling is begun.

All instruments, linens, polishing materials, the table upon which they are laid, and everything with which the operator's hands may come in contact must be sterile.

During the progress of treatment the instruments should be frequently washed with sterile water, and dipped into seventy per cent. alcohol solution.

We prefer to have the patient in a recumbent position for treatment.

The individual tooth or teeth to be surgically planed should be protected from saliva by placing sterile cotton rolls upon their buccal and lingual surfaces, having previously adjusted a sterile saliva ejector. The teeth should be sponged with a seventy per cent. alcohol solution, dried, sponged with tincture of iodin and desiccated with a jet of warm air.

Their individual surfaces should then be thoroughly and carefully planed, not only free from calculus, but a fraction of a millimeter of the peripherally-infected cementum, with the devitalized peridental fibers which are attached in the lamellæ of the cementum should be curetted or planed away, leaving smooth, freshened, finished surfaces for the cemento-genetic layer of the peridental membrane to approximate. By the curettage of the devitalized, necrotic, organic-infected tissue from the surface of the cementum, we hope to eradicate this pathogenic irritant and thereby promote healthy granulation in the sockets and re-establish an approximately normal environment for the affected teeth.

Our instruments must be keen-edged and well balanced in order to avoid pits and scratches upon the planed surfaces. Planing instruments having a pull cut are preferable.

After this surgical procedure, the pocket should be irrigated with warm normal saline solution, flushing the debris from the pockets.

Owing to the delicate technic required for the surgical treatment, a great deal of time is necessarily consumed in the curettement of each tooth, and we would advise against subjecting the patient to more than one hour's treatment per day, which will be employed in the surgical treatment of one tooth.

Malocclusion of teeth which are affected with periodontaclasia, or in a mouth predisposed to the condition, is responsible for a chronic traumatic inflammation of the peridental membrane. Therefore this condition must be corrected in all our cases.

Strips of thin articulating paper are placed upon the occlusal surfaces of the lower teeth and the patient is instructed tc bring the teeth into occlusion and articulate the teeth in all directions.

Small stump wheels of carborundum are then used to grind down the points which are demonstrated by the tracings from the carbon paper to be in malocclusion, and the articulating paper is readjusted, articulation is repeated and the points ground down as before.

This technic should be repeated daily during the entire period of treatment until proper occlusion is established and maintained.

It is not necessary to grind extensively into the tooth structure to correct malocclusion in these cases; therefore we rarely if ever have to grind through the enamel upon the tips of the cusps. However, these surfaces are self-cleansing and caries would not result even though the dentin were exposed.

Dental caries is produced by the action of acid-producing bacteria and their products. Acid-producing bacteria must be afforded the necessary pabulum for their metabolism. This pabulum consists of food debris, mucous plaques, disintegrated, exfoliated epithelial cells suspended or precipitated upon the crowns of the teeth and suspended by a more or less homogeneous calcic matrix.

If we can definitely eliminate debris from the mouth we can prevent dental caries. "Clean Teeth Never Decay" is a slogan of my local Dental Society, and we know our slogan is positively authentic. Therefore, systematic prophylactic treatment at frequent intervals, means preventive dentistry and we now realize that preventive dentistry means preventive medicine.

The term, "cleaning teeth," is not only *passe*, but is malignantly unscientific. The obsolete pseudonym should be applied to the malicious malpractice indulged in by the unscrupulous, spurious dental hermaphrodite who sells the patient a filling and throws in the cleaning.

Oral prophylaxis is that branch of dentistry established to maintain the health of the teeth and their surrounding tissues, therefore must be performed as a definite, delicate routine of technic.

An oral prophylactic treatment consists of the removal of all deposits from all surfaces of the patient's complement of teeth and the polishing of all of their surfaces.

The instruments employed in this technic must be keen edged, but not sharp pointed. The cementum should be curetted, but not scraped or scratched and pitted by the removal of the deposits.

The tissues must not be perceptibly traumatized by the surgical instruments nor the polishing instruments.

Delicate technic and ample time are the requisites for a thorough prophylactic treatment.

Properly-shaped orange wood points, manipulated with port polishers, are perhaps the most efficient instruments employed for this work; however, we will not condemn the rubber polishing cups and mandrel propelled by the dental engine, for polishing labial, buccal and lingual surfaces of the crowns of teeth. If carefully used a great amount of time is saved, but the engine must be propelled very slowly to prevent undue friction upon the crown surfaces.

In any surgical procedure we should guard against unnecessary trauma. If the patient is hypersensitive, conductive anesthesia should be employed to prevent surgical shock. Submucous infiltrative anesthesia is contraindicated in the treatment of dental periclasia on account of the danger of dissemination of the infection, which would result in a definite reaction.

After the case can be diagnosed clinically cured, systematic prophylactic treatment at intervals of from one to three months should be given as a preventive measure.

In cases of periodontaclasia where two approximating teeth are involved, with pockets approximating each other, the septum of bone between the teeth is necrotic upon its exposed surface; therefore it becomes necessary to curette the septum to eliminate this irritant. After the cementum has been surgically planed, the septum must be curetted with small sterile bone curettes, burs or mounted stones, and the pockets irrigated with normal saline solution.

All overhanging ledges of fillings, crowns or inlays, must be made flush with the cavity margins and necks of the teeth, before surgical treatment is begun, because such irritants preclude a plus prognosis.

In fact, all restorations of lost tooth structure must be definitely, positively and scientifically correct as a first aid in the treatment of all mouth or tooth lesions.

We must follow the rules of aseptic surgery as closely as is practicable, relieving the traumatic and chemical irritation produced by the infected deposits upon the cementum, remove the pyogenous granulation tissue from the sockets and establish drainage, if we are to succeed in the promotion of healthy granulations and the eradication of periodontal foci of infection, which in the last analysis, is our responsibility to the patients who confide themselves to our care.

Hume-Mansur Bldg.

ELECTROLYTIC MEDICATION.*

BY GEORGE T. FETTE, A.M., PH.D., D.D.S., CINCINNATI, OHIO.

THE SUBJECT of electrolytic medication in the last eight months has created such contrariety of opinion among the profession that it appears almost impossible to discern where one functions as a petty adversary or where he stands out as a staunch defender of a truly scientific principle. The subject before us, if properly sifted down, has no opponents—it leaves no room for partisanship—and whatever difference of opinion is advanced is found, in the last instance, not to be one of real opposition but only one of co-extension, each under a distinct and separate aspect. The subject of electrolytic medication involves such a large number of phases and subphases, belonging to the different branches of the sciences, that the slightest misinterpretation of any one of these easily may lead to a confusion respecting the entire process. Thus, for instance, one authority, who calls himself a physiologist, may claim that the electrolytic process is incapable of destroying bacterial life. This statement may be true or it may not be true. We allow the statement but we distinguish in the following manner: We do not employ the electrolytic process for its own powers—as a process considered in itself—but we use it to convey medicinal ions into the tissues and obtain our antisepis in a pharmacological way.

Another authority would employ sodium chlorid (saline solution) in treating root canals, stating that nascent chlorin is the desideratum for antisepsis. We can urge absolutely no objection against this viewpoint. The authority is on safe grounds. But we raise our objection by answering as follows: Nascent chlorin is obtained as a product of electrolysis and is applied *topically* only, just as nascent chlorin could be applied if it were produced in the root canal by some chemical means. This authority uses the electrolytic method not primarily for medication (*i. e.*, for driving in antiseptic ions), but only for producing nascent chlorin, which is then secondarily applied for therapeutic effect. You understand electrolysis is one of the phases without which no electrolytic process could go on, and as this one phase is the characteristic feature in the treatment, and ionic migration is not made use of, you note this method is necessarily a surface treatment only, and cannot compare with the true electrolytic process which is founded upon ionic migration for its basis.

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*Read before the Ohio State Dental Society, December, 1917.

Another authority, (Dr. M. Rhein), of New York twenty years ago employed electrolytic medication on absolutely the same principle as we apply it today. Instead of basing his explanation on the ionic migration of the zinc ions, he argues the point in stating that nascent oxy-chlorid of zinc is formed which acts as the antiseptic agent.

The pioneers of cataphoresis of the famous school of Dr. W. J. Morton, unconsciously employed the electrolytic process whenever they had successes, but their conception of cataphoretic transport defeated their aim and purpose. If they had given their attention to ionic migration instead of defending cataphoretic conveyance, electrolytic medication might today occupy a pre-eminent position.

Another authority attributes all the virtue of electrolytic medication to his zinc-anode, which he implants permanently in the root canal, and designates all other authorities as failing their goal and getting lost in the underbrush. In this authority a technic which is only a subphase of the electrolytic process, is made the domineering aspect of electrolytic medication.

Referring to our English and French authorities (Sturridge, Lewis, Jones, Leduc) who have achieved the most gratifying results, we observe that they conceive electrolytic medication in its true acceptation, but they err in their explanation of some of the subordinate phenomena as the production of ions by the electric current or by secondary chemical reactions.

We are not amazed, in the least, at the prevalent suspicion among the profession regarding electrolytic medication when we review and take notes as to what each authority has to say. Now in view of the existing discrepancy of opinions—which is such only on the surface of it all—it will be absolutely necessary to refer to fundamental principles as they are accepted in the respective departments of the sciences from which they have been borrowd by us. By so doing we can hold our ground as scientists and avoid the criticism of appearing rather polemical. It is in this sense that I desire to defend the electrolytic process of medication by gauging every view point in the light of the theory on which it borders. I defend no particular method or technic; this remains to be elaborated by the profession as a body. I claim no originality except in my aim and endeavor to shape the entire process into a comprehensive doctrinal system, and consider myself amply rewarded for my labors if I can speak a word of encouragement to you all by proving that electrolytic medication is a desideratum fully worth the price of its attainment.

We define electrolytic medication as *the process of transporting medicinal ions into the tissue to be treated by means of the galvanic current.* We thus present an essential definition which appears simple in the extreme and yet there is no subject in the entire realm of dentistry which requires the mastery of so much allied and subsidiary information as does this particular study of electrolytic medication. The diversity of names alone which have been offered to designate this process gives one much matter for consideration. It has been called *"ionization"* from the fact that ionization is a phenomenon within the process or that which takes place, or must have taken place, before electrolytic conduction can be possible. Of all the names this particular one appeals to me the least. It appears to me as putting the cart before the horse. If ionization were consequent upon electrolytic conduction I would acquiesce, but as it is, ionization being a condition of electric conduction, we must have the ions already formed just as the builder needs the brick with which to build. Brick-making, therefore, is not the essential in the house-building trade, it is mostly not even thought of. Ionization, however, will engage our attention again.

The name electrolysis has been suggested. Electrolysis, indeed, plays a great role in electrolytic medication, for without this phenomenon taking place, no ionic migration could be conceived, which is the dragging in of medicinal ions. Electrolysis is concerned and assists in the process of electrolytic medication, but it is not the essential. But because electrolysis does take place ionic migration must follow as a consequence. This migration is the essential which, coupled with the phenomenon of electrolysis, was called by Faraday an electrolytic process. This electrolytic phenomenon now is the essential in the medication of which we are speaking. This is why I suggested this name in my original communication on this subject.

Another appellation is "ionic medication." This name is quite expressive because it intimates that we medicate with ions. Now since we can medicate with ions in the absence of the electric current also, as we do when we make a topical application of an ionic drug, the term is of wider extension than that which we intend. We wish to convey the idea of medicating with ions by means of the galvanic current. If so, then let us employ the term "electrolytic medication."

Another expression often met with is the term "to electrolize" a part. This expression means to decompose a substance by the electric current. Evidently we do not mean to decompose the part which we say we are electrolyzing. Hence, let us discard the word in this application.

The term "Electro-sterilization" also is met with and it also is not properly chosen, because there is no sterilization by means of electricity as such, primarily; secondarily and indirectly we might allow the term.

The last expression which I wish to mention is the word "to ionize." To ionize means to split up a molecule into its positive and negative ions. Now the only way in which we can do this is by placing a substance in water, providing the substance is an ionogen. Now evidently when we treat a part we do not intend to split it up into ions. The understanding might be to treat or affect a part with ions, and in this case the word is ill-chosen because it means to produce ions and not to affect with ions. A word to express the above meaning could possibly be coined as "to ionify," or better still, "to electrolytify."

I touched upon this question of names in a former publication on a more theoretical basis, and I suggested the words "electrolytic medication," which express the full essence of the process in question.

Let us now proceed to expand or declare our definition. There are two particular phenomena taken from physical chemistry, which need special treatment before the process of electrolytic medication can be fully understood, and these are *Ionization* and *Electrolysis.*

Ionization may be defined as the phenomenon of a substance dissociating in such a manner that the dissolved particles become carriers of electricity, or in other words, it is the splitting up of a dissolved molecule into two particles which become respectively charged with positive and negative electricity. We may show the process of ionization by the following illustration:

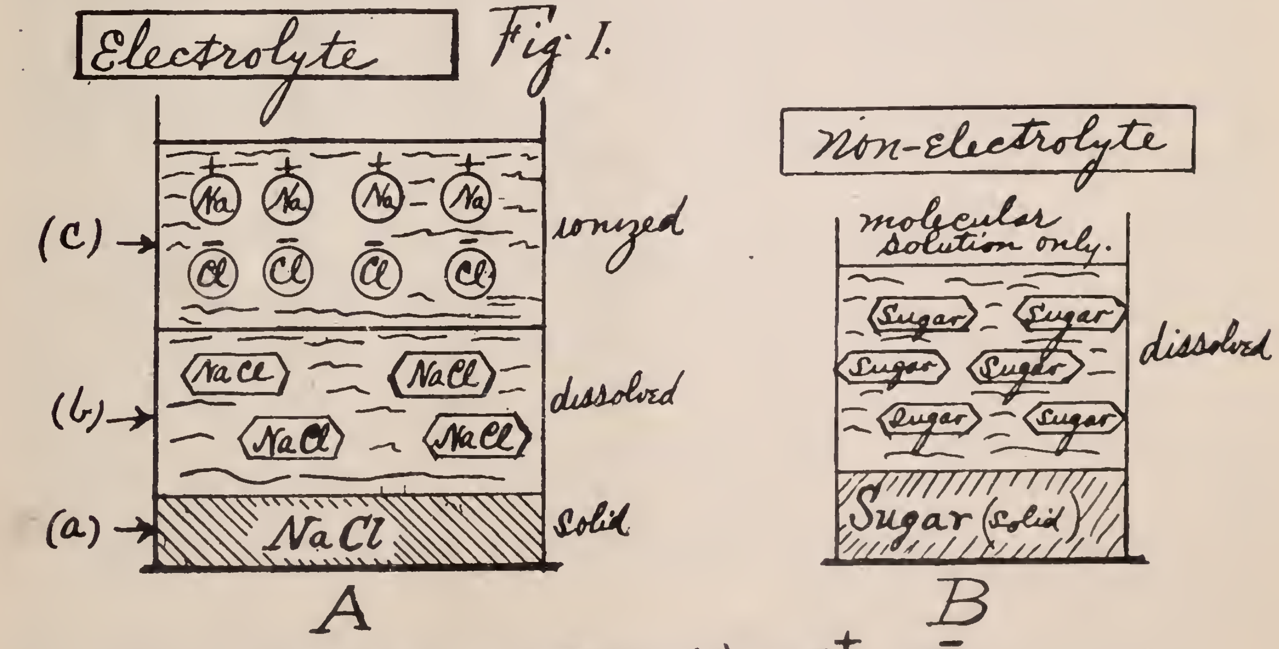


Fig. I.

(I) NaCl(solid) → NaCl(diss'd) → $\overset{+}{Na} + \overset{-}{Cl}$

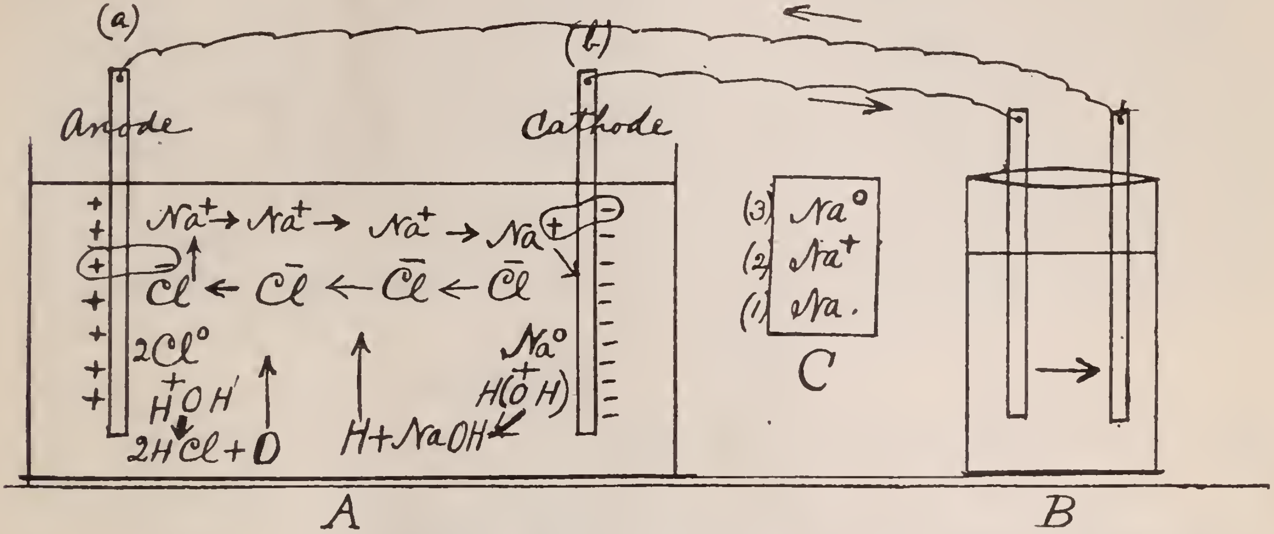
(II) $C_6H_{12}O_6$(solid) → $C_6H_{12}O_6$ (dissolved).

Let (*A*) represent a vessel in which we place common table salt (sodium chlorid) and pure water. At (*a*) is shown the solid state, at (*b*) is shown the dissolved state where the force of cohesion between the molecules is overcome, and the molecules are enabled to move about freely, which is the characteristic feature of a liquid. This is known as a molecular solution. If at this stage of the solution we tried to pass the electric current we would not succeed because a purely molecular solution is incapable of electrical conduction. Now if more water is added than is necessary to merely dissolve the molecules, the solution not only becomes more diluted, but the molecules themselves are split up into two particles, one of which becomes positively charged and the other negatively, as we show at (*c*). At this stage, now, it will be found that electricity can be conducted across the solution. All solutions which allow this electric conduction are called *electrolytes.* But there are a number of solutions which are incapable of conducting the electric current, and these we call *non-electrolytes.* In *Fig. 1* at (*B*) we show such a solution, namely common sugar water, and we observe that no dissociation of the molecules themselves has taken place as in the case of sodium chlorid. We note then that some substances dissociate and others do not, and as a general rule, the former include all inorganic acids, bases and salts, and the latter organic compounds. This dissociation of a molecule into electrically charged particles was a discovery of Arrhanius in 1887, and was called by him "electrolytic dissociation." This electrolytic dissociation is what we mean when we use the word ionization. As it often happens in the sciences, what ought to be known first is discovered last. Faraday knew of these electrically- charged particles 52 years before and called them *ions;* but he did not understand the real nature of the dissociation. Now whenever we have electrolytic dissociation we have the formation of ions, and formation of ions is ionization. Remember we obtain electrically-charged ions simply by dissolving a substance in water. We need no electricity for these changes. But whence do they come? We know a chemical substance has a different quantity of energy in its solid form from that which it has in its dissociated or ionized condition. This difference may appear as heat being given off or taken up. This difference also may be mechanical work or we may have instead of these the electrical equivalent. These quantities can be worked out mathematically. Now the charges on the ions represent *potentially* that energy which could be obtained as electricity if the system were arranged in the form of an electric cell.

The next question that interests us now is how do these electrically charged particles conduct the current? What is the whole mechanism? This will clear up in our description of electrolysis. (*Fig. 2.*)

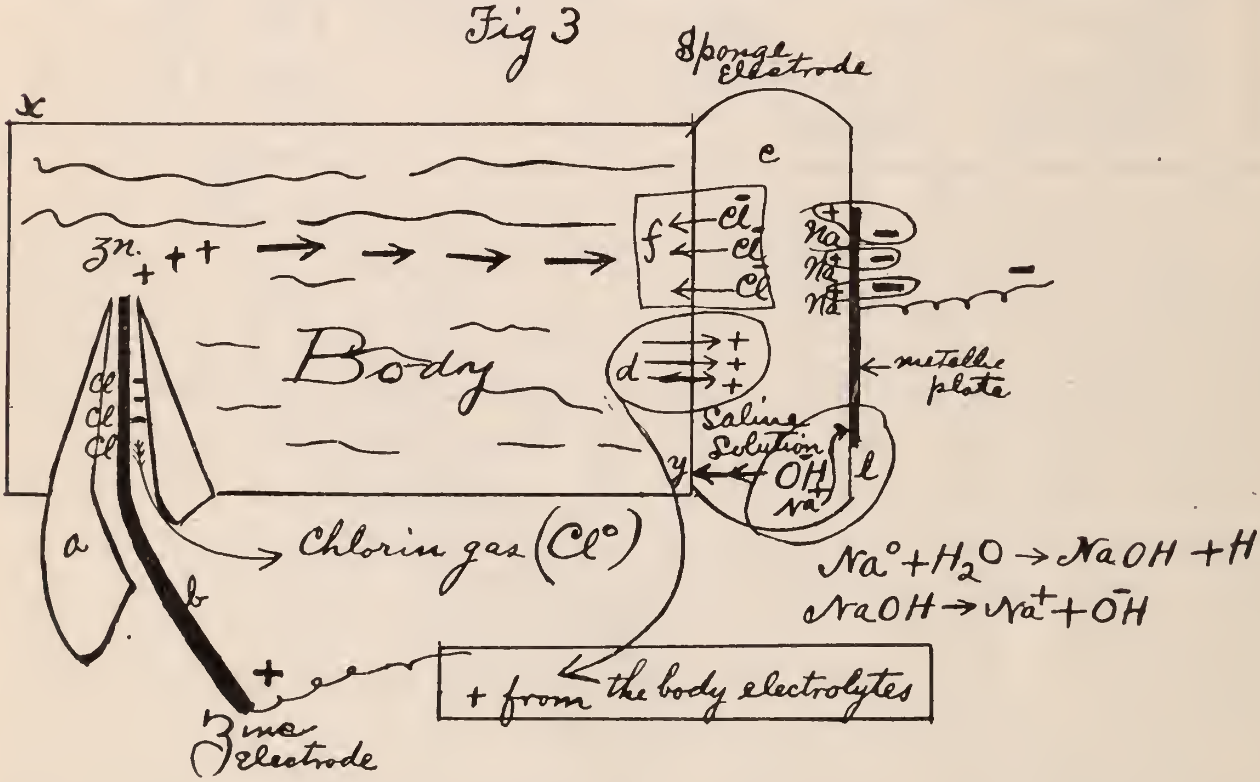
Let (*A*) in *Fig. 2* represent the electrolytic cell containing the electrolyte sodium chlorid such as we ionized in our illustration No. 1, by simply adding water. Let (*B*) represent the source of an electromotive force. If now the current be turned on, the two electrodes (*a*) and (*b*) will become respectively charged with positive and negative electricity, as we indicate by the plus (+) and the minus (—) signs. First of all let us study the events which take place at the cathode. Some sodium ions with their positive charges are in immediate contact with this electrode. Now as we know from physics this condition of opposite charges can not exist, so that neutralization of the opposite charge must follow. If so then the sodium ion loses its charge and becomes free metallic sodium, something chemically different from what it was before. We indicate this neutralization by the loops around the electrodes (*C*). This free sodium will either deposit itself on the electrode or form a secondary reaction with the water. One sodium-ion (*Na*) being thus removed necessitates another ion to come up in contact with the electrode to be in turn set free. Thus we obtain a steady movement of the ions which we designate as *ionic migration.* If we now turn our attention to the anode we notice that the same conditions prevail here that we observed at the cathode. The positive charge of the anode removes the negative charge of the chlorin ion, which then becomes free chlorin, and may pass off as a gas or may unite with some hydrogen of the water to form hydrochloric acid, in which even oxygen would pass off instead. You note now for every sodium ion set free at the cathode one chlorin ion is simultaneously liberated at the anode. But these two ions originally constituted the molecule sodium chlorid. Hence, you see why electrolysis is defined as a *decomposition of a chemical compound by the electric current.* At (*C*) in *Fig. 2,* I show the symbol for sodium in these different ways: At (*1*) sodium has no sign attached. This represents the atom as it existed in the molecular or before it was

Fig. 2.



ionized. At (*2*) we have the positive charge which it acquired after ionization. At (*3*) we exhibit sodium with a degree-sign (°), which indicates free sodium such as it becomes after electrolysis. With the conception now of ionization and electrolysis we are in a fair shape to show its application to the body in electrolytic medication. I exhibit a diagrammatic illustration of the complete arrangement in *Fig. 3*. Let xy represent the body in which is implanted the tooth (*a*) with the zinc anode (*b*) in position. At (*c*) we show the sponge electrode saturated with salt water, sodium chlorid, to form a continuity of electrolytic fluid with the body. This indifferent electrode is connected with the negative wire. We suppose the zinc anode (*b*) to be wrapped with cotton and saturated with zinc chlorid solution. If we now turn on the current electrolysis will set in at once, chlorin gas will be given off on the zinc wire and sodium will be liberated on the metallic plate of the sponge electrode. Now we necessarily wish neither the chlorin gas nor the metallic sodium, but we want this electrolysis upon the metallic surfaces of the electrodes in order to obtain ionic migration which takes place between these electrodes. With this migration we accomplish our medication. In *Fig. 3,* I allow three ionic charges to be neutralized on the sponge plate. For these three charges neutralized I obtain the migration into the tissue of three charges of zinc ions as shown at the apex of the tooth.

Fig 3

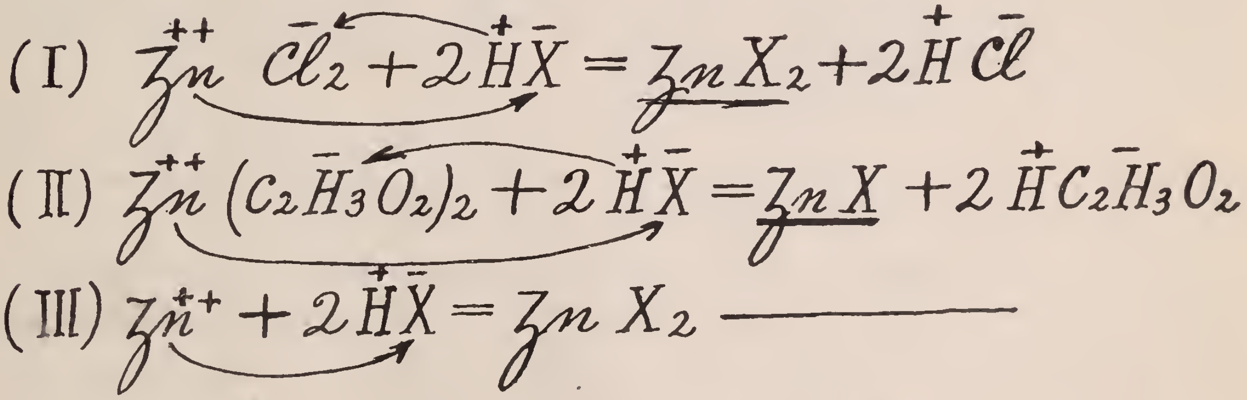


First: I want to make use of this diagram to explain to you a few additional facts which are of interest. At (*d*) I show a group of arrows indicating that these positive charges pass out of the body for the three positive charges of zinc ions introduced at the apex of the tooth. These charges which pass out may be any ion; generally those of the body fluids which have the greatest migration velocity pass out first. I expatiated on this ionic equilibrium to some extent in my New York paper and will not repeat here.

Second: In group (*f*) I show three negative ions passing into the body from the saline solution of the sponge. These three negative charges are to compensate for the three charges that are set free on the zinc wire in the root of the tooth. Of course for the present we assume that the migration velocities of all the ions concerned are equal. The negative chlorin ions at group (*f*) are in the ionic condition not harmful to the body—in fact our body is saturated with chlorin ions—whereas the chlorin set free in the root canal around the zinc wire is an extreme irritant. As free chlorin it is a gas and may readily escape, as is shown by the curved arrow. In this connection I would like to call your attention to this nascent chlorin. It is the factor which Dr. Prinz uses in his method "electro-sterilization." Nascent chlorin gas, as you know, is a powerful antiseptic, but the application is only a surface treatment and by no means electrolytic.

Third: in the absence of medicinal solution around the zinc wire in the root, zinc ions from the zinc anode will nevertheless pass on into the tissue at the apex, because metallic zinc is a soluble electrode. Just as many charges of zinc ions will pass in as there are charges set free on the sponge plate, as stated before. Indeed we favor much to get our zinc ions in this way. I would refer you to my original communication in the March issue of the *National Journal* for the physical chemistry of this phenomena. Dr. Custer recently has introduced a method based on this principle. He seals a zinc cone permanently into the root canal and applies the current to the exposed end, which, if need be, can be reached any time for a re-charging. This method, which is rather a technic in the method of electrolytic medication, substitutes what workers in this art of healing always have claimed, namely, that ions may be obtained from the metallic anode itself. So far so good, but I apprehend a grave objection to this technic. I will point out to

Fig. 4



(I) $\overset{++}{Zn}\,\overset{-}{Cl_2} + 2\overset{+}{H}\overset{-}{X} = \underline{ZnX_2} + 2\overset{+}{H}\overset{-}{Cl}$

(II) $\overset{++}{Zn}\,(C_2\overset{-}{H_3}O_2)_2 + 2\overset{+}{H}\overset{-}{X} = \underline{ZnX} + 2\overset{+}{H}C_2\overset{-}{H_3}O_2$

(III) $\overset{++}{Zn} + 2\overset{+}{H}\overset{-}{X} = Zn\,X_2$ ——————

you again in *Fig. 3,* for every positive charge of zinc ion that passes from the zinc wire (or zinc cone) one negative ion of some sort must be liberated on the zinc anode in the root. This negative ion always yields a gas, coming as it does, from the acid radical of a salt. Now the root being hermetically sealed, as the technic prescribes, an undue accumulation of gas must occur which can not remain without serious consequence. While zinc in our estimation furnishes about the most powerful antiseptic ions, yet other ions may sometimes be indicated, such as iodin, salisylic, or even cocain, which by the Custer method could not be done, and we would be absolutely limited to the zinc ion only.

Fourth: One other point while we have *Fig. 3* on the screen may be a brief reference to the saline solution employed with the sponge electrode. The sodium set free does not deposit on the metallic plate as would silver, copper or some other metal, but it at once reacts with the water to form sodium hydroxid, as I show in groups (*c*). This sodium hydroxid (Na OH) at once ionizes into sodium ion (Na) and hydroxid (OH). Both these are now ions of the sponge electrode. Sodium migrates to the plate and the hydroxyl ion (OH) travels toward the skin of the body. Hydroxyl ion is highly caustic, and as this ion travels three times as fast as any salt ion we must not be surprised when we discover a nasty burn upon removing the sponge electrode. These burns may occur when a metal cathode is applied directly to the skin. They occur from the electrolysis of water. You know the hydrogen ion upon electrolysis escapes as gaseous hydrogen and the hydrozyl ion remains behind. Again they may happen by electrolysis of the sodium chlorid of our body fluids. Instead of saline solution I would recommend the use of magnesiun sulphate.

Before closing my paper I would like to say a few words on ionic chemistry, as it is directly applicable to pharmacological reactions. We have many drugs which act by virtue of their molecules as a whole, just as chloroform, sulphuric acid as a dehydrating agent, zinc chlorid in concentrated form as a caustic, alcohol, etc. A majority of our drugs to a greater or less degree act in virtue of their dissociated molecules, *i. e.* by their ions. Thus, for instance, chlorin may occur as a free molecule; in this case it is a powerful antiseptic and at the same time a highly-irritating agent. Chlorin in the ionic state, as when sodium chlorid is dissolved in water, is a very harmless, indifferent agent. In a concentrated condition chlorin ion has a schlerolytic effect. *i. e.* for loosening joints, etc. In brief, ionic drugs have different pharmacological values. Thus among the antiseptic ions we may mention hydrogen, silver, mercury, copper, and zinc. Magnesium is an ion favorable for reducing œdema. Cocain is an anesthetic ion. Quinin is a sedative.

Iodin is an antiseptic as well as a counter-irritant, and salisylic ion a highly antirheumatic ion. The reaction of these various ions may be exhibited by chemical formulas, and we will take a zinc salt for our example, be it a chlorid, a sulphate, an acetate or any soluble zinc compound. Equation (*1*) shows an interaction between zinc chlorid and albumin which we represent as H X. X standing for the complex of carbon hydrogen, nitrogen, sulphur, etc. You note the reaction is not between the molecules of zinc chlorid and the albumin, but rather between the ions of these compounds, as we indicate by the curved arrows. The zinc albuminate (ZnX) is underlined to show that it is the precipitate or coagulum. We are not prepared to state that this coagulum consists of the albumin of the germ body, for this result would require a germicide rather than an antiseptic, since the cells of the bacteria are more difficultly acted upon than the cells of our own body. At any rate the coagulation is an alteration of environment which an antiseptic is supposed to produce, and in which the bacteria must eventually die. No chemical reaction of a double decomposition can take place without two resulting substances. The second one in our equation is hydrochloric acid. This acid is a highly-irritant reagent and should be avoided. In equation (*2*) we substitute zinc acetate and we get as secondary product acetic acid, which is about 200 times less irritating than hydrochloric acid. This is generally the case with organic compounds and this is why we prefer these substances in medicine. The reactions outlined in these two equations take place in our topical treatments; they take place when we seal an antiseptic in the root canal or when we dress a wound with some suitable drug. But we just saw that the reactions are between the ions; consequently the therapy may be properly called *ionic medication*. Hence it is that this expression is not quite correct when we wish to specify the process of medicating by means of the galvanic current.

Now, let us particularly turn our attention to equation (*3*). In the electrolytic method—supposing we were to employ zinc chlorids,—we saw that zinc ion only migrates into the tissue and that the chlorin ion is liberated on the zinc electrode with which we apply the drug. Consequently if any chemical reaction is to follow from the ion we introduce, it alone can enter into combination and the formation of a second by-product, as the acids in the first two equations can not take place, since we did not allow the negative ion to enter, from which this second product must necessarily follow. Thus you see in electrolytic medication we not only have penetration, which mostly fails in the topical treatments, but we also avoid the formation of the undesirable acids. I think I am the first to point out this advantage, as I stated in my New York paper.

The double decomposition reaction which we just employed to illustrate ionic chemistry is one of the simpler processes. The oxidation and reduction processes are extremely more interesting, but they are also more difficult to understand. We all have a fair conception as to what is meant when we say, for instance, hydrogen peroxid oxydizes the tissue. You understand by this that oxygen was given off from the hydrogen peroxid and added itself to the tissue just as when iron rusts in the air we say oxygen from the atmosphere was added to the iron and the iron become iron-oxid. The truth of the whole process of oxidation is not simple addition of oxygen, but rather a transfer upon the tissue of the iron of *ionic charges.* Again, if we take metallic zinc it has no ionic value, but if we combine it with chlorin or any acid radical it obtains the value of an ion with two positive charges: we then say the zinc was oxidized, and yet no oxygen was added at all. Without going into this matter more deeply we may state briefly that oxidation is an addition or an imparting of positive charges or the removal of negative charges. Likewise we may state reduction is the removal of positive charges or the importing of negative charges. In this light you note oxidation and reduction processes are still more particularly ionic in nature than the reaction of double decomposition. This consideration is of great importance to us in electrolytic medication, because the two electrodes with which we operate have oxidizing and reducing powers. The anode is the oxidizer and the cathode the reducer.

I will give you one example and then dismiss the subject. You know iodin in the free state in which it can exist by itself has a purplish-brownish color. If it is put into a compound like potassium iodid it is perfectly colorless, but in the compound it represents the negative ion. As a negative ion then, iodin is colorless. Iodin to go from the free state to the ionic condition means reduction, *i. e.*, the iodin becomes reduced. Again to turn the process around, *i. e.*, from iodin ion to free iodin, would mean oxidation. Now this process can be observed at our electrodes. If we take Lugal's solution—tincture of iodin is no electrolyte—and apply with the negative electrode in the tooth you will note the color disappears in about one minute. You imagine it was all driven into the tissue. No, it was all reduced to iodin ions. Iodin free as we see it is no ion. We know from other circumstances that the colorless ions migrate into the tissue. From this last statement we infer that we would fare equally well by taking some iodid instead of Lugal's solution. Yes, we could employ zinc iodid with the negative electrode. In this case the iodin ion would be transported into the periapical region and zinc would be deposited on the zinc needle. By changing the polarity the same drug could be used for the zinc ions, and iodin would be set free which would be preferable to the chlorin gas, which is very irritating. By similar reasoning zinc acetate could be employed with great advantage. The zinc ion could be sent into the periapical region, and the acetate radical set free. But the acetate radical not being capable of separate existence, would break up into carbon dioxid (CO_2) and ethylene-gas, both of which are non-irritating and perfectly harmless. Again zinc permanganate could be advantageously employed for treating pyorrhea, because zinc ions would be the penetrating agents and the permanganate ions being momentarily in the nascent state would act as a topic antiseptic. By a judicious study of the pharmacologic ions a very suitable list of drugs could be worked out. This remains for the profession to do. We are not limited to any individual ion, we may employ a mixture of them. For instance, a mixture of zinc chlorid and sulphuric acid has given good results. In painful cases a mixture of cocain and any zinc salt has proven beneficial. A mixture of zinc and copper ions may be employed, and so forth. All ions are possible only in water solution (except in a very inferior degree in formic acid and methyl alcohol), therefore our first attention should be drawn to this fact. Never use alcohol, because alcohol is an absolute non-electrolyte and never can be made an electrical conductor, even if you add an acid, for the conductivity which you would obtain is due to the acid and never can be gotten from the alcohol. All ions have different migration velocities. This may be a guide to us in determining the time of administration. On a rough scale we may consider the migration velocities of the ions of the ordinary salt as unity; then hydrogen would be five times as fast, hydroxyl ion three times and iodin about two times as fast. Therefore in applying an acid, for instance, we would use one-fifth the time.

425 Clark St.

PRESIDENT'S ADDRESS.*

BY CHARLES P. GROSLEY, D.D.S., ST. LOUIS, MO.

THE DUTY devolving upon me, as your president, to deliver an address furnishes the opportunity to express my appreciation of the honor and trust imposed upon me. In pursuance of my duties I desire to bring before you the great amount of good this society is in the position to do.

In the short time I have been elected to this honorable office I have found it a great pleasure in meeting so many big-hearted, clear-headed. broad-minded men, dentists whose great aim in life is the greatest good to the largest number of their fellow men. The younger men should seek these meetings, as little do they realize the benefits derived from them. I have always looked forward to these gatherings, and we all know that we have been benefited by attending them, and never leave a meeting but what we take back with us some new idea.

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* Read before the St. Louis Society of Dental Science, 1918.

This society, gentlemen, is solely for scientific purposes, as the name indicates. The jealousy and hatred that have existed in the past amongst members of the profession is passing away. We are growing in knowledge and strength. We see the folly of a selfish, sordid, single existence. Great progress comes only through a united effort. Help your neighbor solve some of these perplexing problems and every time you will be benefited.

The dental profession has intricate and vital problems to solve, and it is going to require the united efforts of its members to solve them. These men must be united in purpose and feeling to accomplish that which is desired. Gentlemen, with the united effort of the Executive Committee we will try and give you this coming year a program you cannot afford to miss. The papers will be from the most prominent men, and the speakers to discuss them will be of the best.

I urge that each member of this society bring in at least one ethical member this year, and in that way our society will be in a position to do better work. I am sure we will all become better acquainted with the brothers in our profession, better acquainted not only with the work of their hands, but more than all else with the ideals they are dreaming of for the betterment of our society and the uplifting of our glorious profession. The solving of many problems, however, has emphasized how much there is yet to be done. The need for persistent application and concentrated effort by the individual as well as by societies is more keenly appreciated by the professional mind than ever before. All over this broad land of ours there has been a great awakening in our profession, and the good work which is being done by dental societies for the benefit of the human race can hardly be overestimated.

The year just passed was marked by a very interesting program,—a credit to our society and a credit to our worthy past-president. We shall continue this year by starting where he left off, and make the program a banner one.

Our dental meetings give us many opportunities. We meet our neighbors, compare investigations and experiences. Here rivalries, jealousies and controversies can be softened and professional friendship can be formed and cemented, and here you can find opportunities for pleasant social intercourse with worthy men. Association naturally stimulates ambition, develops intellect, and makes one brighter and more companionable. Dentistry is not only regarded as a sister to medicine, but is a great and mighty science in itself. We often hear of the wonderful advancement the medical profession has made. We hear of the great problems that are being better understood and solved. Gentlemen, I tell you that the dental profession, we men that are congregated here, have problems that have not yet been solved, and they are as important to mankind as those of the medical profession, and it is up to us to solve or help solve them.

In our general routine of work we must not be satisfied with our yearly income. Our expenses are greater, and in order to do greater things, we must be true to ourselves and be in a position to command such fees that will enable us to do better work. Although the fee question is a personal one, still in a general way an airing-out in a dental gathering every now and then is a good thing. I am not going into details by arguing the fee for individual kinds of operations such as fillings, crowns, plates, etc., as I fully understand that each case having its peculiar conditions should receive its individual consideration. I do believe, however, that the profession should realize that when a piece of work is conscientiously done and the very best effort used by the operator to prevent his patient from systemic diseases, then your fee is well earned. Another very important procedure is the proper recording of dental work, a complete record and history of the case, procedure and results, the general condition before and after treatment. Complete records are essential in every well equipped office.

Again I call your attention to the importance of our Dental Societies; how urgent it is for members to be present and receive all the valuable information. If one will only glance over the records of research work done by Gilmore, Billings, Hartzell and others, he will find that there is a great deal to discuss at our meetings. Roseneau in his clinical evidence of the etiologic relationship between chronic circumscribed infections, particularly those in the tonsils and teeth, and systemic diseases, is now becoming generally recognized, although the idea is not new. Attention has been called to this mode of origin of various diseases by observers for years. We want to constantly keep this important subject before the dental profession in order to impress upon them the realization of absolute careful judgment in the manipulation of various dental operations.

Physicians and dentists should work together in harmony on the great work of mouth infection. The former should not advise the extraction of teeth without consulting the latter. When focal infection is found or suspected in the mouth by the medical practitioner, his plain duty lies in referring the patient to the family dentist, with such suggestions to the dentist and not to the patient as he may deem advisable in the case, thereby permitting the members of the two professions to work together harmoniously for the benefit of the patient's health.

The simple method of treating and filling a root canal as we were taught to do years ago, leaving the results to luck, will not do. The profession will not tolerate the filling of root canals with the manufacturers' so-called quick abscess cures, or their permanent antiseptic canal fillings. This kind of dental procedure must not be tolerated. We must all do our work conscientiously. We must in our practice not only save these teeth, but in so doing we must prove that there will be no foci present.

If we are relieving or curing serious, if not fatal, systemic diseases, why should we not consider ourselves as general pathologists and solve the difficult etiology of dental caries and gingivo-osteo-pericementitis? With the correlation of the mouth as an integral factor in the general nutritional scheme, and of that, in turn, to the whole human body, constantly before us, we are developing a greater respect for the vitality of the dental organ and its adjacent tissue; so we are beginning to *think* pathology even if our daily practice is largely mechanical in the application of it.

We must not be too empirical in the wholesale extraction of teeth. When the physician sends his patients to us for proper diagnosis, we must be very careful of all the conditions present. A general history of the case is necessary, and a careful study of the pathological conditions is absolutely necessary before giving your opinion. Remember we have many optical illusions when observing the X-ray, and teeth should not be extracted without a very careful study, although we must take into consideration that it is a proven fact that the extraction of the proper infected roots clears up systemic arthritis.

Further, what has been written on this subject from the dental standpoint is so very recent, and of so radically alarmist a type, as to be misleading, if not actually harmful to the practitioner. A careful review of these articles leaves the reader under the obsession that every disease which flesh is heir to is produced by oral sepsis. However, systemic disease has gone too far to be contradicted that it is due to pus, but as such it is necessary to keep all this under careful consideration, and the physician must not take too much advantage.

It is recorded that a patient was sent by a certain physician to a certain dentist with the statement that the patient was suffering with a severe arthritis, and as he had heard that arthritis was caused by the condition of the teeth he felt sure the patient's teeth should be extracted.

Of course the dentist investigated and he was a good deal interested to find two full rubber dentures in the patient's mouth. It is a dangerous thing for a man to advocate taking out involved roots or partially-decayed teeth, which by sterilization probably could be held for putting on a bridge, or the retention of a crown, or other dental restorations. Of course all diseased teeth should be extracted, but be sure that you have infection present before advising their removal.

"No doubt Dr. Gilmore is correct in his statement that over 25 per cent. of all adults have alveolar abscesses in some form. But we do not believe that it necessarily follows that even 25 per cent. of this large number will show systemic damage from such abscesses. Bad though they may be (and filthy locally), the elements protecting their gastro-intestinal tract, and the immunizing powers of the blood and tissues, must be recognized in this connection."

Let us, however, remember the extreme gravity of many of these cases. If every member of our profession could see and realize the helplessness of a case of arthritis deformans, the utterly hopeless attitude of the patient and the suffering, protracted often into two score years, he would agree that no detail is small which caused such sorrow, no amount of study too great to relieve even one of these cases. All would unite in condemning the criminality of careless root-canal work which might induce this and other diseases.

And herein lies the most important point in the study of periapical infection, and here we need more of dental pathology. In every dental office a well equipped dental pathological laboratory is necessary in conjunction with our mechanical laboratory, for the true finding of these conditions, thereby putting us in a better condition to serve our patients.

The pulp under prompt and correct technic may be treated and removed, while little good comes from interminable medication of the root-apex, and its removal is not as successful as it might be. According to my knowledge there is no medicament nor method, germicidal or electrolytic, that will revivify the pericemental apex. If it be vital, the tooth is healthy; if it be necrotic, the tooth is next to doomed. At this point in treatment materia medica stops and good surgery begins. The responsibility of the operator rests in the application of every method known to his art, in taking sufficient time to open thoroughly all root-canals, and in filling them as skillfully as his technic will permit; and, if they cannot be opened and filled, he should admit it to the patient, who must be warned of the danger. Herein lies the culpability of the dentist; he must not allow the patient to pass from his hand under the impression that the tooth is free from disease, when he knows down in his heart that he has not reached the apex which is likely to be necrotic. "Bluffing" the matter through with germicidal pastes is gambling on the patient's ability to resist pyogenic after-invasion, with no risk to the operator and great danger to the patient. While sufficient time should be given for perfect sterilization, long continued irrigation of fistulous abscess tracts is a waste of time.

If once convinced of the cleanliness of a canal, the operator should fill it. This of course means surgical cleanliness, and in case one is undecided, an X-ray film will show if there is need of apicœctomy.

It might be said that the dentist never should be called upon to devitalize a pulp. That is good theory but poor practice because the patient still presumes to make his own diagnosis of mouth diseases, of which pain generally from an exposed pulp is the first symptom; and for pulpitis there is no treatment but devitalization and removal, with all the attendant risks. It may be said that the life and death equation with all of its responsibilities enters quite as much into the daily routine of the dentist as it does into that of the surgeon—only it is not so immediately apparent. The fact that serious sequelæ arise years after the dental operation does not ameliorate for one moment the culpability of the dentist who misleads the patient and himself on this question.

In conclusion I will state that one of the greatest needs in our profession to-day in my opinion is a standing together, shoulder to shoulder, for the betterment of our condition, professionally, socially, and financially. We have only to take heed of the example set for us by our more humble brothers in the trades to see the tremendous advantage of co-operation (this touch of the shoulder in the ranks), over the lack of co-operation due to the small and petty jealousies and bickerings we find continually cropping out in our profession. This uncharitableness is the greatest bane and blight of our profession today. This doctrine of hate, which some men seem to practice, is fatal to our progress. It is my belief that the day that sees every dentist in this city big-hearted enough and charitable enough and wise enough to see and appreciate the absolutely suicidal effect which this spirit of selfishness and self-aggrandizement has upon his chosen profession and upon himself directly as a member of it, that day will be the brightest day that ever has dawned upon the profession of dentistry.

435 Frisco Bldg., St. Louis.

Taking a Bite for Crown or Bridge Work

One of the most difficult items in operative dentistry to contend with is the taking of a satisfactory bite, particularly where the occlusion is close. When the wax or compound bite is removed it often breaks in two pieces making it difficult to obtain a perfect cast for the occluding surfaces to be articulated to the crown or bridge about to be constructed, or breaks when placed on the plaster model. Many ideas have been advanced for overcoming this, such as placing a piece of linen, cut about the length and width of the bite to be taken, then placing the wax above and below the piece of linen, taking the bite in the usual manner. The linen holds the bite together and prevents biting clear through. A better and more rapid way of obtaining this result is the use of the Articu-Bite, a nifty little instrument in which all manner of hard, close, difficult articulations and bites can be obtained in two minutes' time without the possibility of a mistake.

—Dr. W. E. Beachley, Hagerstown, Md.

EDITORIAL

ARMY REGULATIONS AFFECTING THE DENTAL CORPS AND DENTAL EDUCATION.

Dentists were the first of the professions to fill their quota in the Dental Corps. Not only was the response great enough to fill the quota, but enough enlisted to leave between two and three thousand commissioned men yet uncalled to duty.

This month, September, an authorization was made increasing the dental corps to one for every five hundred in the ranks instead of one per thousand, provided by legislation during the past year.

The new order will bring the commissioning of from 3,000 to 5,000 more dental reserve officers by next spring or early summer.

Some of our dentists have already enlisted in the army as privates and are in service in various camps. These will have the first opportunity to take an examination for commission in the dental corps. That is, they will precede any who may be conscripted and are at home. The first vacancies in the dental corps to be filled, however, will be from among those men already holding commissions.

Unless some later ruling is made for those dentists of conscription age who are to enter service, they will have to enter as privates, and after being assigned to camps can apply for examination to enter the dental corps when vacancies exist.

Dental officers will also be assigned in other units, one for each Evacuation Hospital overseas, two for each Base Hospital overseas, three for each 1,000-bed Hospital in the United States. In addition to the number of dental officers enumerated above, four enlisted men serving as mechanical dentists will be assigned to each of these positions, and also one to each Hospital located in the United States.

The mechanical men will be entitled to grades provided for men in the medical department to and including the grade of sergeant.

Regarding dental colleges and dental students, we might add that all dental schools recognized in the surgeon general's office will be permitted to establish a Students' Army Training Corps, the same as in other branches of education. All students in the Students' Army Training Corps will be furnished clothing, food, and tuition, by the government, and in addition receive $30.00 per month pay. These students will be housed in barracks or other houses provided by the schools and approved by the government, and all study and recreation hours will be under military supervision. One medical director will be placed in charge of each dental school.

Examinations in military and professional subjects will be given every three months, and those who do not attain an established grade will be dropped from school and sent to camp for general military service. On account of the time consumed in military training it may be found necessary to require more than the usual thirty-two teaching weeks to cover what has been termed the year's work.

Those male students who may be found physically unfit for military service, and foreign students, will be permitted to purchase their own uniforms and receive the military training without additional expense if they so desire.

For the Relief of Pain

It frequently happens that extreme pain follows the extraction of a tooth or root. Almost immediate relief may be given the patient by inserting a pellet of cotton wet with chloroform to the full depth of the root socket and place your finger firmly over the mouth of the socket for from ten to twenty seconds, then remove the cotton from the socket. Repeat if necessary.—*H. A. Cross, Oral Health.*

Une ne se carie jamais

American Red Cross worker showing French children the importance of taking care of iheir teeth and how to keep them clean. Over 173,000 people attended this child welfare evhibition. The motto, "Clean Teeth Do Not Decay," is as applicable in our own "second line of defense" as just behind the front.

CORRESPONDENCE

Preparedness League of American Dentists

News and Notes

COMMUNICATION FROM THE PRESIDENT

We are starting our third year with the following officers elected at our annual meeting in Chicago on August 9, 1918: President, J. W. Beach, Buffalo, N. Y.; Vice-President, J. D. Millikin, San Francisco, Cal.; Secretary, O. A. Oliver, Nashville, Tenn.; Treasurer, L. M. Waugh, New York, N. Y.; Representing the Surgeon-General's Office, Lieutenant J. V. Gentilly, New York, N. Y.; Director General, W. D. Tracy, New York, N. Y.

We deeply regret the resignation of Dr. C. F. Ash as Director General, but activities in other directions made it imperative. He has been appointed a member of a committee for the conservation of platinum, an office which will occupy a large share of his time. His services as Director General have been of inestimable value to his country and to the League and a more efficient incumbent could not have been found. I know every member joins me in these sentiments, together with good wishes and the hope of long service to his Government.

The assurance given by Dr. Ash that his interests are with the League at all times, also that his services will be given just as freely as before has somewhat mitigated the effect of his resignation, but nevertheless, we shall greatly miss his active management of so important an office as that which he so ably occupied.

THE NEW DIRECTOR GENERAL

Dr. Tracy, our new Director General, has been Director for the Department of the Northeast as well as Chairman of the New York Unit of the League. He is, therefore, especially qualified to assume the broader duties, inasmuch as he has been, as it were, the understudy of Dr. Ash.

No better selection could have been made following Dr. Ash and it gives me great pleasure and satisfaction to indorse him in every particular. This step means for him great sacrifice, but he has offered himself willingly and gladly to this great service. Every worker of the League will receive fullest co-operation from his department and I know he will receive equal return from our members and the benefits of our work will continue to increase.

We have a great work before us, for the League is developing into a real public service institution. We have at present no less than eight distinct objects, each of which demands special service from our members. The League is in position to direct all members of the profession to give full service to the great cause in our own special field. We have no need to look elsewhere for work to do.

Let each one of our army of 18,000 members become an ardent, conscientious worker in the vineyard of humanity, for the success of the Colors and the triumph of justice and right.

COLONEL LOGAN AND THE LEAGUE

In his President's address before a great audience of more than 5,000 people in the Auditorium Theatre, Chicago, on the evening of August 6, last, Colonel Logan, as President of the National Dental Association, spoke in most appreciative terms of the service the members of the League have rendered in making the registrant dentally fit for military duties. We are deeply grateful for such expression, yet feel that our members are justly entitled to it. No one will ever know the amount of free service given by the dentists of America, not more than one-third of which will ever be recorded.

A suggestion was made by Colonel Logan that, inasmuch as the military camps are now well equipped, the army dental department is in a position to do the necessary fillings for the recruit after entering the service; therefore, it is his desire that the League give special attention to reclaiming the dentally unfit in order to place them in Class A. By so doing, the dentist may render the greatest service to the Government by augmenting our fighting forces.

This suggestion is both timely and needed, particularly as the draft age has been extended to include a vast army of men who will need fixed bridgework to put them in the firing line. To do this means time, money and sacrifice for all of us, but we *will do it* without question or complaint. It is our duty and no right-thinking dentist can side-step the issue.

Continue doing all necessary fillings and extractions as heretofore, for *there is more dental work needed* by our soldiers than could be done if *every one* of the 50,000 dentists of the United States should devote his whole time to this purpose. Shoulder the additional burden manfully and cheerfully for the sake of our own boys who are laying down their lives by the thousands, that we may spend our declining years in our own peaceful country and under the protection of the flag that shall bring enduring democracy to the whole world.

Assure Colonel Logan of our co-operation in this way.

THE WHEELS OF THE LEAGUE

The Dental Motor Car exhibit in Grant Park, opposite the Auditorium Hotel, during the meeting of the National Dental Association at Chicago, proved to be one of the most interesting features of the convention. Chairman Weaver secured a host of friends for the car and its future usefulness is assured. The Red Cross soon will begin shipping them overseas for active service at the front.

It remained, however, for Dr. Ottolengui to again demonstrate his resourcefulness and originality of thought by inaugurating a plan for securing a Dodge motor car for the special use of the dental officers in each military camp. This movement is much needed, as a motor car will greatly increase the usefulness of the officers by transporting them rapidly on their daily round of duties.

Through his activity, ably assisted by Dr. F. M. Casto, more than $1,100 was raised in less than one hour at the meeting of the American Society of Orthodontists and he immediately ordered a car delivered at Camp Greenleaf. Another one has been ordered for Camp Upton and more will follow as rapidly as possible. These cars will be presented through the League and will pass from commandant to commandant as changes occur in the camps.

OUR STUDY COURSE

One of the most urgent duties of the League is to make available a course in war oral and dental surgery for the civilian practitioner. We are exerting every effort to have it ready as soon as possible. Some delay has been caused by unavoidable circumstances, but League members may be sure no further delay will occur.

J. W. Beach, *President.*

COMMUNICATION FROM DIRECTOR GENERAL TRACY.

While it is true that as the Dental Corps of the United States Army increases in numbers and efficiency the need for volunteer services on the part of the Preparedness League in connection with filling operations will correspondingly be reduced, it is not intended that the activities of the League shall be curtailed in this respect at present, as the accession of men from the new draft will be greater, both as to numbers and rapidity of induction than heretofore. It is, on the contrary, absolutely necessary that greater impetus and effort be given to our work.

BRIDGEWORK

It is also desirable that the scope of our work should be broadened to include the restoration of those registrants who are physically fit for General Military Service, and are held in Group C solely because of their dental deficiency.

A large percentage of these cases can be restored by the insertion of small bridges, thus bringing them up to the minimum dental requirements of six masticating teeth in occlusion, and six incisive teeth in occlusion. No extensive restorations by bridgework are contemplated. In other words, only those cases are recommended for treatment which can be brought up to minimum requirements by the insertion of a small and inexpensive bridge.

At present there is no Government regulation compelling registrants in the class mentioned to have this work done at their own expense, and no provision exists making it possible for them to have this work done at the cantonments.

Most of the men mentioned above are anxious to be made dentally fit in order that they may be inducted into General Military Service and thus be of use to their country in the fighting line. I have found that with few exceptions the Local Boards, throughout the country, are very appreciative of the dental services which have been rendered to the registrants under their control, by the members of the Preparedness League of American Dentists, and I am sure if it is known that we have a large list of volunteer dentists who have offered to take cases of the type outlined above, a great number of registrants now standing in Group C can be restored and immediately transformed to Class 1-A.

It is, therefore, plainly the duty of every member to write to the League officer in charge of the work in his section notifying him that he will be glad to take one, two or more cases each month, without expense to the registrant, the League or the Government.

FAMILIES OF SOLDIERS

Our activities should also embrace the care of dependent families of our soldiers, sailors and marines, who are unable to pay for dental services.

It has also been stated that one of the greatest possibilities for service on the part of the Preparedness League and its members would be a full and free co-operation between the League and the Home Service Section of the Red Cross.

In many instances the wives and families of soldiers in the U. S. Army who have been accustomed to private dental treatment, but who, because of the reduction in their incomes cannot now afford to go to a private practitioner, should be taken care of by the Volunteer Dentists of the Preparedness League.

The Home Service Section of the Red Cross, through their authorized agents, will investigate each case as presented and in those cases recommended for dental treatment at the hands of the Preparedness League, the patient will receive a card bearing the endorsement of the Red Cross, stating that the patient is a member of a soldier's family and worthy of free dental treatment.

In this manner much suffering can be alleviated and much dental trouble prevented among the families of the men who have gone forward to defend our country.

The medical profession is already co-operating most generously with the Home Service Section of the Red Cross and it is hoped that every member of the P. L. A. D. will share in this work.

This type of work has already been begun by a number of Preparedness League Units in various States and the pleasure and satisfaction which the members are finding in taking care of these cases warrant us in believing that it can be extended to every State in the Union.

Plans are now being formulated to take care of this new department in our activities and it is the intention of the officers of the League to have the work so arranged as to bring no special hardship on any one member.

While the Allied forces are meeting with gratifying success at the front and ultimate victory is assured, this is no time for relaxation in any of our war activities or patriotic efforts and it is only by putting every ounce of human energy into action that the result desired by all truly civilized peoples can be attained.

As a national patriotic body of professional men we are strong and well organized, but in a few States the work has developed slowly and it is urged that in such States the Directors and Officers grasp anew the great possibilities of the League's work and take up with increased determination the duties they have assumed.

Assuring you of my desire to assist and co-operate with you in every possible manner, I am,

Yours very truly,
W. D. TRACY,
Director General for the United States.

COMMUNICATION FROM THE COMMITTEE ON MOTOR CARS FOR CAMPS

The undersigned visited Camp Greenleaf this summer. Camp Greenleaf adjoins Fort Oglethorpe, Ga., and is some six or eight miles from Chattanooga, Tenn. Here are situated training schools for medical men, dentists and others. It is with the Dental Training School, of course, that we are most interested. The writer quickly discovered that the dental corps at each military camp is sadly in need of means of rapid transportation about the camp, and to the neighboring city. Military camps accommodate from 25,000 to 75,000 men. Cities of that size would have trolley cars, cabs and other means of transportation. Moreover, there would be numerous shops. At a military camp there is but one place for procuring any needed article, and all such places are widely scattered. It is manifest that an automobile would greatly add to the efficiency of the dental corps at each camp, by saving time that would otherwise be expended in walking great distances. This is so true that many officers have purchased second-hand Ford and Dodge cars, but these being private property must be maintained at the officer's individual expense. Bills for gasolene, tires, repairs, etc., etc., make large holes in an officer's pay check. This seems hardly fair.

The writer, therefore, conceived the idea that the Preparedness League should procure a car for Camp Greenleaf. On his return to New York he reported this to Director General Ash, and was surprised to learn that a visit to Camp Upton had impressed Dr. Ash with the same need, and he was just inaugurating a campaign for obtaining funds for that purpose. The writer was then appointed Chairman of a committee to foster this movement. Drs. Ash and Tracy sent out a circular appeal to the dental profession in New York, and through the generous response that resulted a Dodge car has been presented to the Dental officers at Camp Upton.

The writer sent out a circular letter to one hundred men throughout the country asking for contributions to a fund to purchase a car for Camp Greenleaf. Before replies could have been expected to come in, the meeting of the American Society of Orthodontists convened in Chicago, and Dr. F. M. Casto, Secretary of that Society, and an officer in the League, suggested that an appeal be made in open meeting for contributions. This was done, with a response that redounds to the credit, loyalty and generosity of the members of that organization, not overlooking a few guests who were present. $1,131 was subscribed and paid in, in just 38 minutes. A Dodge touring car was purchased by telegraph from a firm in Chattanooga, and was promptly delivered and is in use at the camp. A quotation from a letter of thanks received from one of the dental officers' places an aspect upon this work which is important. It is as follows:

"When the high officers of the camp see our car, and when the instructors in the Sanitary, Cardio-vascular, T. B., X-Ray, Orthopedic and other schools see it they know that the members of our profession are backing us for all they are worth and that we mean business. All such things serve to drive dentistry higher and higher in the estimation of the men around us and through these things, to stimulate us, we hope, to drive so hard that some day when the old standards of dentistry emerge from the war clouds, their colors will be flying high and Uncle Sam and the whole world will turn to our profession and say, Well done, good and faithful servants!"

FUTURE EFFORTS

The League may not be able to supply cars for all the military camps, but we are undertaking to furnish cars for at least ten more.

We are at the moment of preparing this for publication awaiting the decision of the authorities as to which camps are most in need, whereupon the campaign will be pushed. It may be announced, however, that as soon as these camps are selected, the State Directors will be advised and asked to co-operate in collecting funds towards the car for the nearest camp.

After paying for the two cars already purchased and delivered, we are pleased to report that we already have a goodly sum left in the treasury of this fund.

Very truly,
R. Ottolengui,
Chairman, Committee on Motor Cars for Camps.

Southwestern Dental Society.

This society was organized in El Paso September, 1916, including New Mexico, Arizona and Western Texas. The second meeting was held in El Paso January 24, 25, 26. There were 80 dentists in attendance. There was a very interesting program given.

Thursday, January 24. Met at 9 A. M. Address of welcome by Hon. Mayor Chas. Davis. Response by Dr. O. H. Brown, Las Cruces, New Mexico. President's address by Dr. E. J. Algers. Discussion by the Society.

Table clinics: Table No. 1, Dr. W. S. Sample, El Paso, Texas, Quick Way to Back Facings; Uses of Gold Amalgam. Table No. 2, Dr. E. J. Algers, Albuquerque, New Mexico, Reinforced Open Band. Table No. 3, Dr. W. P. Sims of Bisbee, Arizona, Rigid Attachment for Removable Bridge Work. Table No. 4, Dr. M. J. Moran, Deming, New Mexico, The Moran Way. Table No. 5, Dr. R. M. Ratliff, El Paso, Texas, Drop-in Attachment. Table No. 6, Dr. R. H. Gudger, Silver City, New Mexico, Sectional Bridge Work for Leaning Teeth. Dr. A. S. Weaver, Washington, D. C., Methods.

After lunch, 1:30 P. M., Dr. John J. Ogden took up the afternoon with clinic and lecture. Dr. Ogden is from the University of Tennessee and is now instructor in the army, is stationed at Camp Cody, and is one of the leading men in nerve-blocking in the country. He gave a very instructive lecture, and also clinic.

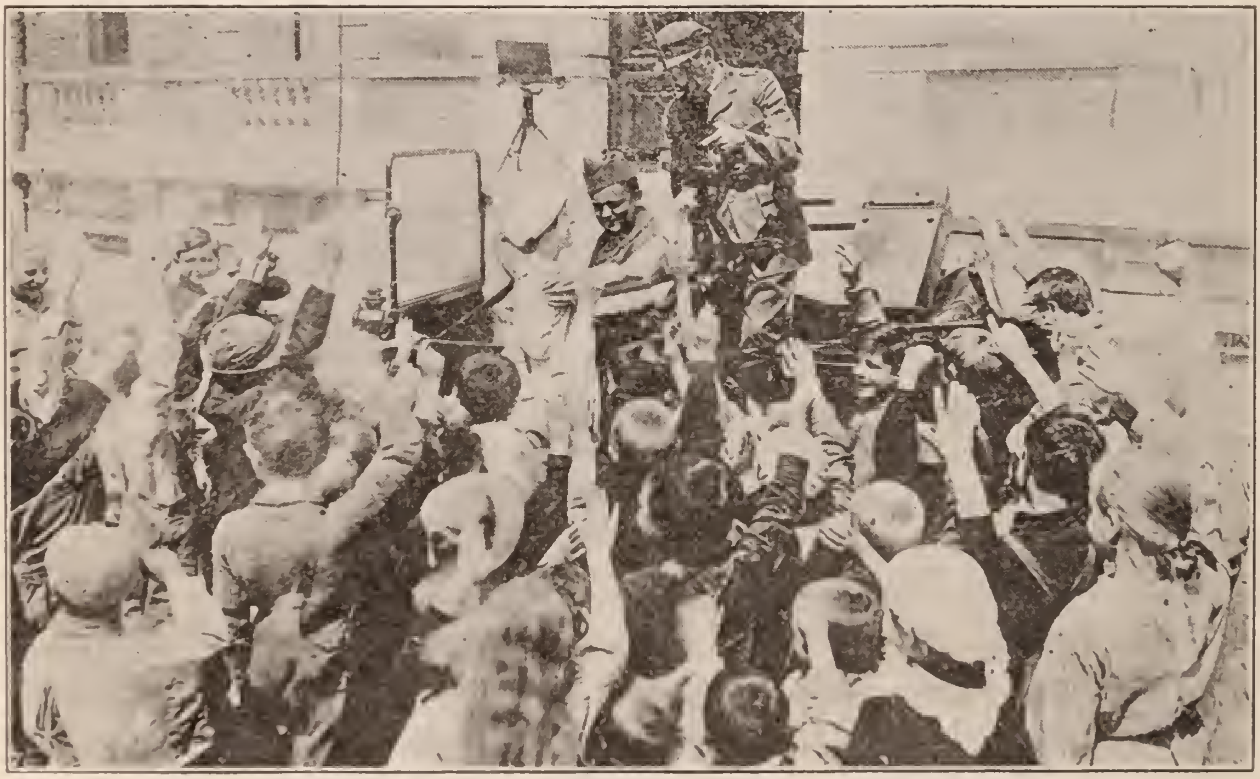
Friday, 9 A. M. The following papers: Compulsory Dental Education, by Dr. P. H. Brown, El Paso, Texas. Relationship Between Oral, Nasal and Dental Surgery, by Dr. J. M. Britton, M.D., El Paso, Texas. Cast Gold Inlays, Technic, Success and Failures, by Dr. M. F. Bauchert, El Paso, Texas.

After lunch we spent the afternoon with Dr. Walter G. Crandall, of Los Angeles, on Amalgam Restoration. Dr. Crandall is undoubtedly the biggest man in the west on this subject, and gave us a very good lecture and clinic, which was very instructive.

Banquet at 8 P. M. Toastmaster, Dr. J. B. Brady, El Paso, Texas. Principal speaker of the evening, Hon. Zach Lamar Cobb. Response from Arizona, Dr. W. P. Sims. Response from New Mexico, Dr. M. J. Moran. Response from West Texas, Dr. C. C. Homan. Also address, Dr. Walter G. Crandall, Los Angeles.

Saturday, 26, the entire morning was taken up with Dr. Crandall. He gave another very interesting lecture and clinic, and all the boys wished we had more time with Dr. Crandall. After lunch Dr. M. F. Bauchert gave a table clinic on gold cast inlays, and at 3 P. M. business meeting and election of officers for next year. Officers elected, E. J. Algers, Albuquerque, New Mexico, President; J. M. Ridley, El Paso, Texas, First Vice-President; W. P. Sims, Bisbee, Arizona, Second Vice-President; R. H. Gudger, Silver City, New Mexico, Secretary-Treasurer. Meeting adjourned. Next meeting January 28, 29, 30, 1919, El Paso, Texas.

DR. R. H. GUDGER,
Silver City, N. M. *Secretary and Treasurer.*



American Red Cross workers are so popular in the neighborhood of this hospital for refugees near Lyon, that the repatriate children even welcome the arrival of the dentist with his instruments. However by means of pictures, magic lanterns, movies, charts and exhibits, these little folks have learned the importance to France of keeping their teeth in good condition, and like their fathers are ready to serve France even if it does hurt.

"REAPING THE WHIRLWIND"

THE INEVITABLE has happened. When the first flush of enthusiasm over the value of the X-ray in root filling was at its height, and following this when the first terror-stricken stampede for cover took place under the lurid announcement of the terrible evils which lurked in the wake of all the root filling of the past; there were certain men in the profession who said some very foolish things, and some of these foolish things got into print. The result is precisely what might have been expected. When men got up before societies and waved their hands excitedly and declared that dentists in the future would lay themselves liable for damage suits unless they filled root canals according to the orthodox methods laid down by the speakers, they were not only saying some foolish things but they were saying some dangerous things. They were unwittingly laying pitfalls for their fellow practitioners, and possibly for themselves.

Everyone has heard of the process, "Sowing the wind and reaping the whirlwind." These men were sowing the wind—*much of it was wind*—and now comes the whirlwind. What better bait could an irresponsible lawyer want than a statement like that to start all sorts of unjust damage suits against dentists? And that is precisely what has been done. We are informed that no fewer than thirty-two damage suits have been started in New York alone. Who is to be blamed? Mostly the men who foolishly proclaimed the possibility of such a thing in the first place. It was foolish from every point of view—foolish because of the invitation it gave to trouble, and more foolish because of the fact that the statements made as to the evil effects of root-canal work had not by any means been established, and we are going to be heretical enough to say that they are not definitely established yet. Who shall say which technic is safe and which not? And who, with a sweep of the hand shall attempt to bring discredit on the conscientious efforts of the men who have for years made an honest attempt to save pulpless teeth for their patients? Are dentists to be dubbed as criminals because they cannot all see things in the same light, and forsooth because they sometimes fail in their operations? Who has ever claimed infallibility for dentists?

And in what other calling are men taken to task because they are not infallible? Mistakes are made by men in every pursuit because the men following those pursuits are human, and if criminal proceedings were instituted against all men who make mistakes, the courts would be full to overflowing.

No conscientious man wishes to condone wilful carelessness in the management of pulpless teeth; no man denies the sacred obligation under which a practitioner is placed to his patient when he is rendering service, and all men will agree that the patient is entitled to the greatest care and a reasonable degree of skill. But to sue a dentist for damages in a case of pulp-canal filling on the evidence presented by X-ray pictures is merely a species of blackmail, and is calculated to work a serious injustice on the practitioner.

We ventured a prediction when the indiscreet utterances previously referred to were made that they would open up possibilities of persecution of dentists, and now that this prediction has been fulfilled we will venture another. Just so surely as these damage suits become general, just so surely will dentists be driven to abandon the effort to save pulpless teeth, and will condemn them to the forceps. We are aware that there are some men in the profession who will rise up and hail this as a fortunate circumstance. We are not of that number.—*Dr. C. N. Johnson, in The Dental Review.*

The Union of the Flags

We have hung out the flags that we love best—
The British, the French, and our own;
Adoring we see them together,
That never together were flown!
And we feel it a bond and a blessing
For every regret to atone.

O flag of my own Land, give welcome!
Be proud to embrace, fold with fold,
These emblems of service heroic,
Whose measures can never be told;
These banners that speak to the future
Of honor that shall not grow old!

Across them is Sacrifice written;
They voice peoples generous, brave,
Who, suffering all men can suffer
This side of eternity, gave
Their best with unflinching devotion,
The wronged and the helpless to save.

They poured out their hearts' blood for freedom;
They stood in the terrible way,
And bore the full brunt of the onslaught
That darkened the sun at noonday.
We gaze with dimmed eyes on their colors,
Our souls strong for duty as they!

We will stand with high hearts by our Allies,
With fear of no evil but shame;
We will face coward Death and outface him,
In Liberty's eloquent name;
For we're of the brood of the Lion
That Tyranny never could tame!

—*Florence Earle Coates in Philadelphia Ledger.*

Extraction of Deciduous Teeth

Never extract a tooth for a child by deception. They receive a nervous shock which may take years to overcome. It makes them dread dentists and everything pertaining to the teeth and is one reason why so many young people neglect their teeth. Never hold a patient by force or extract against his will.

—*Roy L. Spencer, Pacific Dental Gazette.*

SOCIETY·ANNOUNCEMENTS

Indiana State Board

The Indiana State Board of Dental Examiners will hold their next examination at the State House, Indianapolis, November 11th to 16th, inclusive, 1918. For application and information write Dr. H. C. McKittrick, Secy., 605 Hume-Mansur Bldg., Indianapolis.

Michigan State Board

The next meeting of the Michigan State Board of Dental Examiners will be held at the dental college, University of Michigan, Ann Arbor, Mich., November 18 to 23, inclusive. Applications and other information may be obtained by addressing B. S. Sutherland, Secy., Owosso, Mich.

Ohio State Board

The Ohio State Board of Dental Examiners will hold its next examination in the city of Columbus (State University Dental College Building), beginning Monday, October 28, 1918. All applications accompanied by the fee of $25.00 should be in the hands of the secretary no later than October 18th. For application blanks address Holston Bartilson, Secy., 150 East Broad Street, Columbus, Ohio.

Pennsylvania State Board

The next examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Tuesday, Wednesday, Thursday and Friday, December 3, 4, 5 and 6, 1918, at Musical Fund Hall in Philadelphia and the University of Pittsburg, Pittsburg. The practical examination will be held on Friday, December 6th, the last day. Application papers can be secured from the Department of Public Instruction, Harrisburg. For further information address the secretary, Alexander H. Reynolds, 4630 Chester Avenue, Philadelphia.

To measure the circumference of a tooth for a gold band: Run copper or aluminum wire through the rolls to make a very thin ribbon, or buy the flat aluminum wire used in wireless work and roll thinner and anneal. It can be passed around the tooth and easily slips under the gum margin if desired, and may be punched with the tweezers, as we make orthodontia bands. The correct measure of the circumference of a tooth or root can be obtained in this way quicker than the wire can be adjusted in the dentimeter.—*F. D. Price, Oral Health.*

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.)

Post-operative Treatment for Extraction

After a large number of teeth have been extracted at one appointment, either by the aid of local or general anesthesia, the alveolar process should receive some additional attention. All jagged and rough projections, loosened positions and some of the septa between the teeth should be curetted and removed. Such operative treatment hastens resorption, prepares the mouth for better denture foundations, and gives the patient a great deal of comfort during the interim.

—*Pacific Dental Gazette.*

Dr. Rhein's Method for Root-Canal Filling

Base-plate gutta-percha has been found the most suitable material for root filling and especially for encapsulating the end of the root because of its compatibility with the human tissues and its unchangeable nature as far as contraction or expansion are concerned.

Having reached the point in the operation where the root canal in a thoroughly aseptic state has been dried out and ready for filling, chloro-percha made by dissolving base-plate gutta-percha in chloroform is introduced in very fluid form into the canal, which is not only filled with it but the material is pumped through the foramen. A point of gutta-percha, the diameter of which is the same all the way through, is now carried to the end of the canal and there macerated by packing it with fresh chloroform. In this softened cheesy-like condition, it is now by compression forced through the foramen and this soft cheesy-like mass is immediately thrown back around the side of the root. The chloroform volatilizes with such rapidity that the root surface under it is dehydrated, and as a result the softened gutta-percha remains firmly adherent to this surface whether or not covered with pericementum. Such is the ideal physical condition that takes place. This method is found more successful than the one formerly used of endeavoring to force the hard gutta-percha cone through the foramen. In this hardened state the cone has a tendency to protrude like a cork through a bottle on account of its rigidity. Such a result will bring thorough success when there is only a simple foramen, but where we have multiple foramina it generally spells failure of the operation.

—*M. L. Rhein, Dental Review.*

Finishing Silicate Cements

A timesaver that I have found in finishing synthetic porcelain fillings: To keep a synthetic filling enclosed in a dam for any length of time when there is other work to be done in the same mouth is unnecessary. Unloosen the dam holder and with ligature tie in the tooth with the synthetic filling; cut away the remaining dam and proceed with any other work in the same mouth.—*L. C. Blackman, Dental Review.*

A New Method for Making a Porcelain Crown

The following described new method for making a porcelain crown will be found to be very practical for bicuspid and molar roots and specially adapted for short bite cases when a gold crown would not be desirable. Make a coping with one or two posts, according to the requirements of the case. Then, having the coping placed on the root, take an impression and a bite. Make models and adjust them in an articulator, then remove the coping from the model and solder a strip of gold plate around the coping on three sides, namely, mesio-proximal, lingual and disto-proximal, having the gold strip wide enough to reach to, or nearly to, the occlusal surface of the crown as it will be when finished. Then having selected a facing of the proper shade and size, solder the pins of the facing to the post of the coping. Then make a mix of synthetic porcelain of shade to match the facing and fill it in upon the coping, which, having three side walls of gold and the facing as a buccal wall, sustains the synthetic porcelain at every point. While the synthetic porcelain is soft, carve it to an approximal occlusion with the antagonizing tooth in the articulator and when fully hardened grind and polish the porcelain to a proper occlusion.—*H. A. Cross, Dental Review.*

Any tooth whose pulp has been removed may be a source of focal infection. A lateral abscess may occur upon the root surface of a vital tooth. All gingival irritations may produce inflammations which eventually will lead to foci of infections. All pyorrhea pockets are conducive to ill health and should be eradicated. If the health of the part can not be restored by local treatments, the offending tooth or teeth should be extracted.

All teeth the seat of pyorrhea alveolaris must be thoroughly planed and polished. If this procedure fails to restore the health of the part, extraction is the wiser procedure. Extract all teeth without reference to location which the X-ray and clinical observations show to be the seat of an abscess. The virulence of the organisms is to be considered as of more importance than the tooth which causes the lesion.—*W. R Hughes, Pacific Dental Gazette.*

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

LACONIGRAMS

The office of Dr. Wm. Durand, Marshall, Mich., was entered and robbed on the night of Saturday, September 14, the second time within six months, the loss amounting to about $60.00 worth of gold and stamps, including three bridges, six or eight crowns, inlays, and scrap. The door-jamb was jimmied off and the lock, best Yale make, probably sprung. A broken hack-saw was found just outside the door. The work probably was done by amateurs, who did not know the value of platinum scrap that was just beside the gold scrap taken.

In reply to numerous inquiries the information is given that stocks of platinum in the hands of dentists and jewelers is not to be commandeered, as the government has a sufficient supply in hand for all present and near-future needs, something like 40,000 ounces. Dentists are, however, asked to limit the use of the metal so far as may be practicable, as the chief source of supply, the Ural mountains, in Russia, is shut off entirely, all supplies now being drawn from Colombia and Venezuela.

Washington, Sept. 30.—Use of platinum in the manufacture of jewelry or for non-essential purposes is prohibited after tomorrow by regulations issued tonight by the war industries board. No person, unless a manufacturer or dealer licensed by the board, may purchase or sell platinum, irridium or palladium or their compounds, or have in their possession for more than 90 days after October 1 more than one ounce of these metals.

The regulations in no way apply to the sale or possession of jewelry already manufactured. Use of the metals in dentistry, science and other essential work is not prohibited but the users must secure individual licenses.

On October 19 the Fourth Liberty Loan campaign will close. Before that time the largest subscription in the history of the world will have been taken over by the patriots of America. It is not my place to preach patriotism; every reader of The Summary is as good a patriot as I dare to be or want to be: but, just the same, it seems fitting to call the attention of every reader to the fact that in buying Liberty Bonds no man earns the right to any particular consideration; he is simply loaning his money on the best security in the world; he is not giving anything at all.

Dentists are warned of their culpable participation in efforts to evade the draft when they comply with requests to extract perfectly sound teeth by men of draft age. Practitioners who do so subject themselves to the penalty provided for conspiracy to avoid military service.

September 14, 1918.

Editor News and Opinions:

I note in a paragraph in "News and Opinions," September number of The Dental Summary, referring to Dr. Edward Maynard, two errors, one of which at least should be corrected:

Dr. Maynard was born at Madison, New York, (he was not a "Jersey man,") April 26, 1813.

He began the practice of dentistry, or rather his studentship to the calling, in 1835, and, inasmuch as the use of gold in filling teeth was an established practice at that time, and had been in use for centuries, he was not the first to so use it, as the paragraph suggests, unless the saving clause, "modern times," is badly strained.

Fauchard, in his work, dated 1728, gives his method of using it, and all writers upon the practice of dentistry since that date have numbered it among the materials used for that purpose. If he introduced any new or better methods for its use, where is the record of that to be found?

He did good work, some of which I have seen, but not better than did many of his contemporaries, and many who antedated him.

The prehistoric use of gold for filling teeth needs to be marked "?." It has been asserted, but proof is missing. Maynard was a skillful mechanic, and made an impress in many lines. He left dentistry better than he found it, and deserves all due credit for what he did. He found dentistry, however, well advanced. The foundation was laid and well laid. Dental literature from its beginning is well worth far more study than has been given to it. It is a puzzle to know when "modern" dentistry really began.

Yours respectfully,

WILLIAM H. TRUEMAN.

Camp Upton dentists are handling about 400 men per day.

Minneapolis dentists to the number of 398 have rendered free service to 24,042 men during the two months ending August 22. Some record!

Seventeen thousand dentists have been doing free work on recruited men during the past year, and they are entitled to high credit for their patriotic service and its results.

To call a man a slacker, even though he may be a near relative, is not always safe, as is evidenced by the action of an attorney at Mt. Vernon, N. Y., who has brought suit against his brother-in-law, a dentist, for $25,000, for applying that term to him. We can sympathize with the lawyer in everything except the size of the damage claimed. What's the use suing a dentist for such a sum?

The distribution of gold is now restricted to the manufacturers of dental and optical goods, jewelry and watch-cases. The reason why jewelry is not restricted is that it forms one of the best and most convenient export commodities for equalizing foreign exchange rates. It represents a maximum of price with a minimum of war-value, and uses but little space in ships. American jewelry is imported by nations that buy very little of anything else from us.

The Austrian government is distributing among the Czech, Slovak, Jugo-Slav, Croat and Dalmatian populations of the empire, photographs of the capital punishment inflicted en masse on the Czecho-Slovaks taken prisoner while fighting in the ranks of the Italian army.

Instead of intimidating the oppressed peoples the pictures have incited them to greater resistance, and have intensified the revolutionary agitation against the Hapsburg empire.

All the Swiss newspapers condemn the executions as barbarous and call on the oppressed nationalities to avenge them.

Graziani, who commands the Czecho-Slovak troops on the Italian front, declares that his soldiers do not heed the threats and atrocities of the Austrians. They have refused to accept the counsel of the Italian command that they withdraw from the front line and form a reserve.

Somebody is trying to have a little fun with himself by reviving the old falacy of hinging upper and lower plates together and operating them with horizontal and lateral springs—or is the thing merely a hoax originating in the office of "Popular Science?"

Dentists, lawyers, authors, artists and engineers are to be asked to pay an occupational tax of $10 per year.

All operators serving in the Rochester Dispensary are now First Lieutenants in U. S. service, and the Dispensary has been named one of the Government Schools. No student, however, is permitted to perform any service other than that necessary to his studies.

The vaccination law is to be enforced in all public schools during the session begun in September.

Provost-Marshal General Crowder has ruled that dentists are not exempt from draft even though members of the Preparedness League, even though they may be members of medical advisory boards.

Dentists are urged to restrict the use of gold as much as possible until such time as the available supply may have reached safe limits.

"Made in Germany" now means imitated by Germans. Germany has been matchless in that kind of skill which converts the ideas of others to its own purposes, and then tries to convince the world that they originated in the Teutonic mind. Even dyes now "Made in America," are greatly superior to the best ever imported from hundom.

Deaths.

At Friendship, N. Y., September 3, Dr. Henry Baxter Gorton, aged 85.

At Lancaster, Pa., August 19, Dr. Edwin M. Zell, aged 85.

At Wheeling, W. Va., August 18, Dr. Robert L. Criswell; suicide.

At New York City, August 23, Dr. Thomas Bradley, aged about 60.

At Johnstown, Pa., August 28, Dr. Robert G. Covode.

At Los Angeles, Cala., about September 1, Dr. C. S. Kelsay, formerly of Hood River, Oregon.

At Cincinnati, August 13, Dr. W. P. Lindsey, aged 65.

At San Francisco, August 19, Dr. G. H. Therkof; heart trouble.

At Cincinnati, Ohio, August 17, Dr. Richard E. Taylor, aged 76.

At South Bend, Ind., August 15, Dr. D. E. Cummings, aged 71.

At Easton, Pa., August 15, Dr. William A. Eynon, aged about 47.

At Chicago, August 20, Dr. Victor E. Lager, aged 33.

At Detroit, August 10, Dr. James Cleland, aged about 85.

Orleans Gets Big Dental Meeting.

The annual convention of the National Dental Association will be held in New Orleans in 1919, between October 1 and 20. At the 1918 gathering in Chicago, held recently, the attendance of delegates was 8,700, Dr. C. V. Vignes, of New Orleans, being elected president for the coming year. The New Orleans' fight was made by a strong delegation of local dentists under the leadership of Dr. Joseph P. Wall.

"Our city is fortunate in having secured the next year's meeting as the dental convention is looked upon as one of the 'highest-class' gatherings in this country," said Thomas J. Hill, of the convention bureau of the Association of Commerce, who attended the Chicago meeting.

A Daily Duty.

Each day every American soldier in France is confronted by a great duty. Our army there has a great task to perform for our country, for the world, for civilization, and for humanity. Our soldiers are doing their duty with a courage and fidelity and efficiency that thrill every heart.

Each day every American citizen at home is confronted by a great duty, a duty as imperative upon him or her as the duty of our soldiers is upon them. The American people have a great task to perform. It is to support to the limit of their ability our Army, our Navy, our country at war.

To work with increased energy and efficiency so that our national production may be increased; to economize in consumption so that more material and labor and transportation may be left free for the uses of the government; and with the resultant savings to support the government financially is the daily duty of every American. It is a duty that will be met by every American whose heart is with our soldiers in France, who glories in their courage and fighting ability and their success.

X RAY

A complete course of private instruction in DENTAL ROENTGENOLOGY is offered. Special attention to technic. Address

W. I. LE FEVRE, M.D.

452-454-456 Rose Building CLEVELAND, OHIO

Oral Hygiene Literature

Dentists engaged in **Oral Hygiene Work among school children** will find the "Dental Examination Blank and Notice to Parents" we supply gratuitously to the Profession, quite helpful in their work as the employment of it results in saving much time and when filled in becomes a permanent case record. Two charts are embodied therein, showing the temporary and permanent teeth, which are designated by characters; it also contains a few important questions.

Leaflet "The Teeth and Their Care" informs the reader as to proper care of the teeth, date of eruption, importance of the sixth year molars and emphasizes the necessity of frequent visits to the dentist.

This literature is furnished free of all cost, and if desired, professional card imprinted thereon.

Lambert Pharmacal Company
Manufacturers of
LISTERINE
21st and Locust Streets St. Louis, Mo., U. S. A.

Announcement Extraordinary!!!

The annual all day meeting of the Miami Valley Dental Society will be held at the National Cash Register Company's office building, Monday, October 14, at 10 a. m. Lecturer Dr. F. E. Roach, of Chicago.

At 4:30 p. m. Mr. Howard Rheinhart will give you an exhibition flight at Moraine Field. This will be great.

At 7 p. m. the N. C. R. will give a complimentary dinner to the Miami Valley Dental Society and their guests.

Sunday morning, October 13, a match game of golf between Doctors Kibler and Lucas, of Indianapolis, and Doctors German and Beard, of Cincinnati. Don't miss it.

COLLEGES TO OPEN TRAINING COURSE OCTOBER 1.

Revised Military Instructions at 400 Institutions in Country to Be Given by the Government.

Washington. — Rapid progress is being made in the execution of the revised plans for the Students' Army Training Corps. In the 400 colleges, universities and technical schools which have thus far accepted the War Department's offered contract to place their facilities at the government's service, steps to house, feed, drill and instruct the 150,000 students are being taken. It was announced here today that the entire project will be in successful operation by October 1.

Students over 18 entering the fall term of the designated colleges become by voluntary induction soldiers of the United States Army. They will rank as privates and receive the same allotments and pay as a regular soldier. They will be given military instruction under officers of the army and will be kept under observation, and tests will be given every so often to determine whether the students are eligible for officers' commissions or not. After a certain period they will be selected and assigned to military duty in one of the following branches:

A central officers' training camp; a non-commissioned officers' training school; kept in the original school for further intensive work in a specified line for a limited time; put into technical training of military value, or transferred to a cantonment for duty with troops as a private.

The student-soldiers of the Students' Army Training Corps will be housed variously, as the facilities at each institution shall permit. So far as available, fraternity houses and dormitories will be used. Where needed, barracks will be built. Pending the determination and adjustment of exact costs at each school, the government will allow for subsistence and housing a per diem rate of $1 for each man.

Under the scheme of instruction planned for this corps, eleven hours a week will ordinarily be devoted to strictly military subjects, drill and physical training, and forty-two hours to lectures, recitations, laboratory instruction and the necessary preparation therefor, covering a restricted choice among a wide range of subjects usually found in a college curriculum.

Two Good Boys for the Dental Game.

From Los Angeles, Cal., comes the following:

There is a certain United States army medical corps officer who is going to have a merry little time shortly.

This officer is the one who will have command of Hugh and John Merriam, who left their home in Los Angeles today after enlisting in the medical corps.

Hugh and John are twins, very much so. They fooled the recruiting officer. John enlisted and when Hugh stepped up the officer wanted to know why he wanted to enlist all over again.

The brothers are 21 years old and for the past five years have been connected with the California Dental Supply Co. They enlisted on their twenty-first birthday.

Even intimate friends are often baffled by their similarity in appearane. After they get in uniform it will be worse. They are exactly the same height and there is only five pounds difference in their weight.

It is more than likely that the twins will have a distinguishing mark on their uniforms or—heaven help their officer! He won't be able to tell to which of the two brothers he has given an order or which obeys.

The boys laughed at the theory that twins are sometimes gifted with supernatural powers to discern each other's feelings.

"We're just the same as any other two brothers," they said. "Because we look alike there's no reason why we should think alike. We just happened to decide together that it was time for us to answer Uncle Sam's call for men."

Classified Advertisements under this heading, $2.00 each for 60 words or less; additional space, 2 cents per word, single insertion; three insertions or more, special rate on application.

FOR SALE—Dental office and practice of many years, at an exceedingly low price and good terms, in one of the finest agricultural and manufacturing small cities of the middle belt of Ohio. Fine advantages. People pay good fees for good work. Owner retired and interested in other business. Will introduce. Practice now being conducted. Address 1010P care of The Dental Summary.

DEAN OWRE LAYS DOWN THE LAW.

Dentists Must Prevent Improper Diet Which Causes Mouth Ills and Sickness.

"The supreme question for every dentist, as it is for every individual, is: How to help win the war? This is his one goal and to this end he must reorientate his life and practice."

"If we have been lukewarm in some phases of our work or life, now is the time for a fresh start. If we have moved along the path of least resistance, we must now accept the challenge of the present crisis and hold grimly to whatever hard road we may be called."

In this way, Dean Alfred M. Owre, of the College of Dentistry of the University of Minnesota, reminded the dentists of the northwest of their patriotic duty and disclosing the special ways in which a dentist can best serve his profession and his community during war time. Dean Owre placed special emphasis upon the part which the dentist should play as a leader in the movement for food conservation in his community, in a lecture which he delivered at the close of a short course of new methods in dentistry which was recently conducted at the university.

"It is not only the matter of cure through mechanical effort, but the great and fascinating question of right living which must loom large in our interpretation of the science of dentistry," said Dean Owre. "Incorrect diet is increasingly recognized as a contributory cause of many disorders of the mouth, in fact of the system. No intelligent practitioner can neglect the importance of this factor, in prevention as much as in cure.

"Now it is every man's most immediate duty to keep well. Now we are compelled by the exigencies of the military situation to readjust our diet, and it is our professional duty to do so intelligently, and to teach others to do the same.

"Attention is called to the latest developments in dietary reform. Wheat and meat must be reserved for our soldiers. The work of the American people at home is to insure the proper feeding of the allied armies and the maintenance of their wives and children at home, the supplying of the friendly neutrals with food and the adequate support of our army in France. North America must furnish that food and furnish it from savings. The surplus already has been sent.

"This saving can be accomplished only by elimination of waste and substitution. Each pound saved in this way is a pound given to the support of our cause.

"The food crisis brings us the 'acid test' of quiet sacrifice—doubly biting because it demands steady, prosaic self-denial, with no glamor of brass buttons and gold braid. Yet to the man whose imagination has been actually touched by the great war, this quiet daily service to the brotherhood of suffering peoples brings a certain satisfaction of soul. He may not be able to be 'over there,' but he can do a most vital part at home, free from any suspicion of self-seeking. It is a form of self-conquest as great in its way as the taking of a city.

"Moreover, this spiritual reward is far from the only benefit accruing to the man who lives as simply as he must to follow the dictates of a conservation conscience. Many of us are overfed and badly fed. With a change to a balanced and rational diet will come an almost unbelievable improvement in the general health." said Dean Owre.

Dean Owre is the head of the University Economy Campaign Committee, which urges food conservation among university students and members of the faculty.

The War Prophet

Absolute knowledge I have none,
But my aunt's washerwoman's sister's son
Heard a policeman on his beat
Say to a laborer on the street
That he had a letter just last week
Written in the finest Greek
From a Chinese coolie in Timbuctoo
Who said the niggers in Cuba knew
Of a colored man in a Texas town
Who got it straight from a circus clown
That a man in Klondike heard the news
From a gang of South American Jews
About somebody in Borneo
Who heard a man who claimed to know
Of a swell society female fake
Whose mother-in-law will undertake
To prove that her seventh husband's niece
Has stated in a printed piece
That she has a son that has a friend
Who knows when the war is going to end.

Receipts of $16,431,933. July 9, from war-savings and thript-stamp sales, were the largest of any single day since these securities were offered to the public. Sales during the first nine days of July totaled $46,552,529.

Hold Your Liberty Bonds.

The effort to separate Liberty Bond holders not familiar with stock and bond values from their Liberty Bonds has taken a new turn. The manipulators instead of offering to buy the bonds at inadequate prices offer in exchange for them the stocks and bonds of various wildcat corporations, whose face

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XXXVIII November, 1918 No. 11

ARTICULATION OF PARTIAL DENTURES*

BY FRANK M. WADSWORTH, D.D.S., MINNEAPOLIS, MINN.

MUCH HAS BEEN written upon the subject "Partial Dentures" and a great deal of progress has been made not only in retaining appliances and attachments but along the line of impression taking. To the author's mind however, the principal division pertaining not only to partial dentures but to crowns and bridges as well has been almost if not entirely neglected.

At the present moment the subject of this paper is particularly deserving of the most serious and earnest consideration by the dental profession, especially in view of the regrettable condition revealed by the X-ray of the teeth *in situ* and the microscopic examination of extracted teeth.

The multiple foramina and the constricted and tortuous root canals render the prognosis of treated teeth unfavorable to say the least.

Foci of infection from treated teeth are a serious menace to the public health, notably so at this particular time. The advisability of extraction in these cases is self-evident. This being true there are but two ways open for restoration namely, "Partial Dentures and Crown and Bridge Work."

When we know that it is possible to exert but one-tenth as much pressure upon dental bases as upon the natural teeth the great need of extraordinary efficiency in mastication for these cases is manifest.

This brings us to the subject of this paper which is of great importance not only to the dental and medical professions but to the public at large, dealing as it does for the first time with that most neglected division of partial denture construction namely, "Articulation."

The term *Articulation* is so often confused with that of *Occlusion* that it would seem advisable at this time to differentiate between them. Teeth are "articulated" when they are so formed as to most nearly approximate the natural organs and arranged to obtain maximum efficiency during the masticating movements.

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*Read before the Indiana State Dental Society, 1918.

Teeth are "occluded" when they are arranged for the opening and closing movements only.

The dentist usually destroys any real tooth form the porcelain teeth may have been blessed with while grinding off high spots that interfere with lateral and incisal movements. The result being a denture with flat occlusal surfaces entirely lacking in masticating efficiency.

The technic the author has developed is the result of a series of experiments that were carried on to prove his theory that in Partial Denture and Crown and Bridge restorations the natural cusp planes on one side of the mouth have a different inclination than those of the opposite side, due to the different times at which extraction has occurred and that to obtain increased efficiency in mastication the denture must be so constructed that its cusp planes will correspond with those of the natural organs.

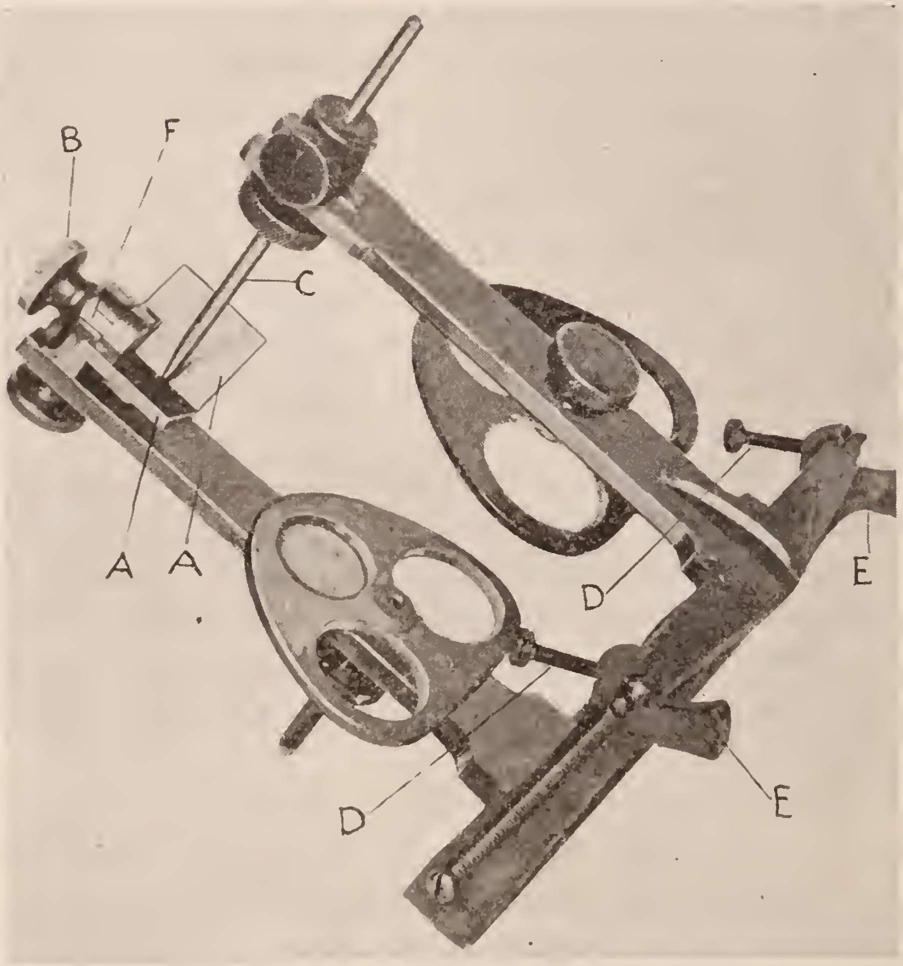

Fig. 1

Fig. 1—The Instrument: AA, Anterior Guide Planes adjustable independently of one another; B, Lock Nut of Guide Planes; C, Incisor Guide Pin; D, Condyle Adjusting Screws; EE, Condyle Paths. Curved parallel to "curve of spee."
N.B. Simplicity the keynote. The guide plane unit may be removed from instrument without changing adjustment of planes. The guide pin unit also may be removed without changing bite opening. F, Graduated Scale.

With the instrument the author evolved it is possible to determine the inclination of the cusp planes of the natural teeth to the exact degree, and use the locked device as a permanent guide in grinding the cusp planes of the restoration to correspond with those of the natural organs.

One using this instrument and method may in a few moments so grind and form the occlusal surfaces of the porcelain teeth used in the restoration, be it either partial denture or crowns or bridges that well nigh perfect articulation may be obtained with stability of denture and comfort to the wearer.

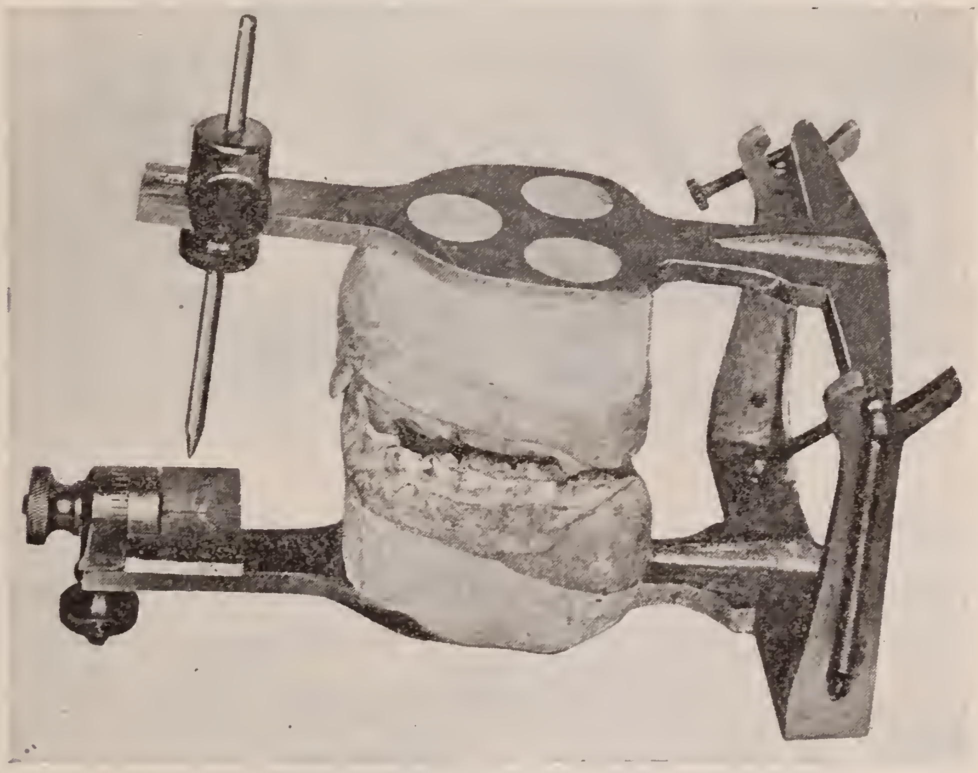

Fig. 2

Fig. 2—Partial Denture. Registering the cusp plane angle of the natural teeth. N.B. The case caused to assume a lateral position by turning the condyle adjusting screw to the right. The guide pin raised from the guide planes which are in horizontal position. The guide plane on that side is then raised to contact with the guide pin, and degree of inclination determined by the graduated scale on guide-plane unit.

A very large percentage of crown and bridge failure is due to pathological trouble caused by poor articulation—articulation therefore is of inestimable value, for when obtained the balancing of stress results in maximum health of abutments, adding years of life to the restoration.

As all of the articulators with which the author is familiar were built seemingly for the one and only purpose of full denture construction it was necessary to design one that would not only take care of full dentures but partial dentures, full uppers against natural lowers, full lowers against natural uppers, and crown and bridge work as well. This was attempted with results far exceeding our fondest hopes.

MOUNTING PARTIAL DENTURES

My experience leads me to believe that the use of the face-bow in transferring the case from the mouth to the articulator is absolutely necessary. The bite-plates are sealed together, face-bow adjusted, removed and the casts set in. The incisor guide pin and the guide planes are removed from the articulator and the casts attached in the usual manner. The incisor guide pin and the guide planes are now replaced in the bows of the instrument, the incisor guide pin raised and the guide planes set in a horizontal position. The incisor guide pin is lowered

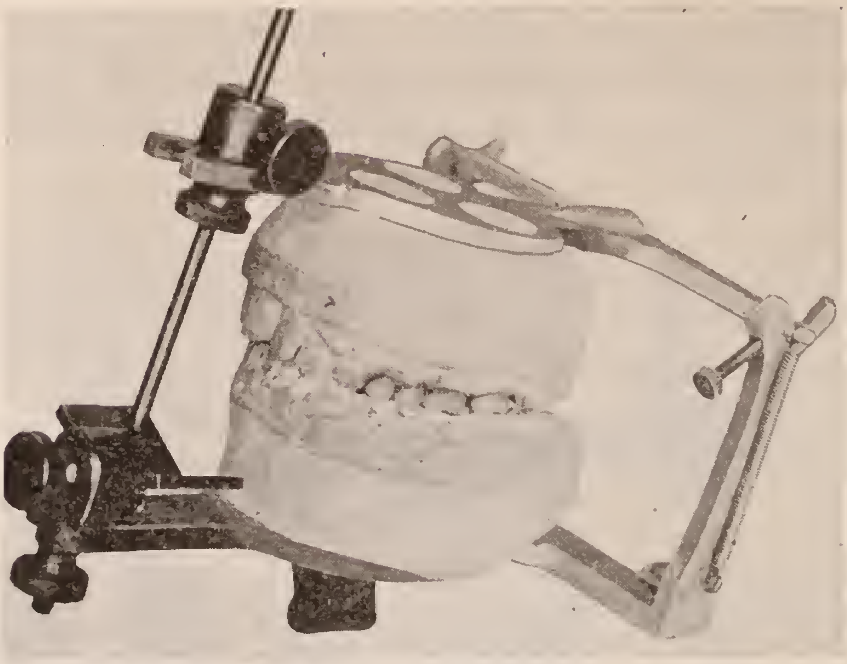

Fig. 3

Fig. 3—Partial Denture. Case in lateral position, showing articulation of restoration.

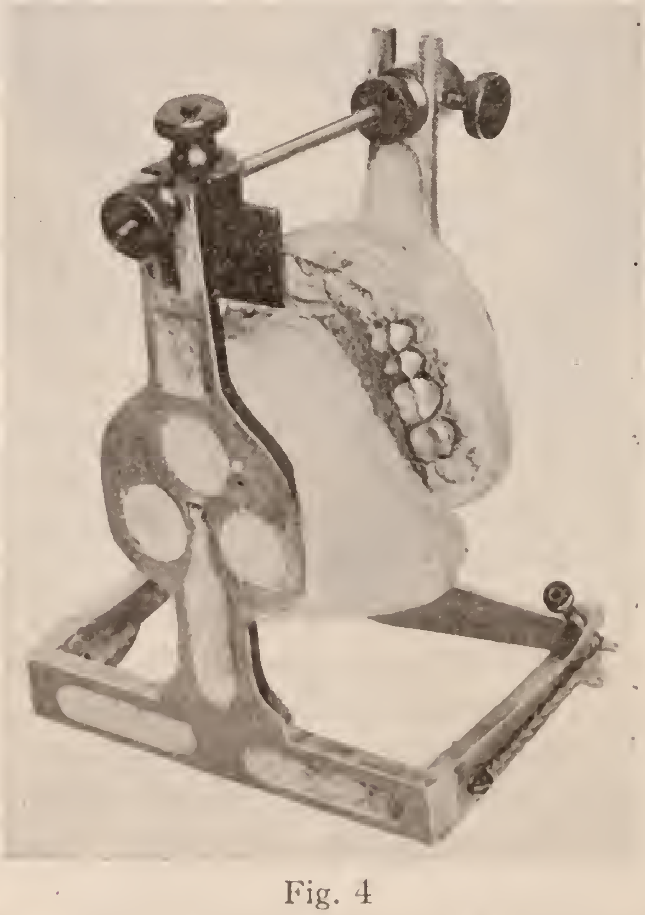

Fig. 4

Fig. 4—Partial Denture. Showing extent of grinding restoration for articulation.

until it rests upon the guide planes along the center line and the screw tightened. The bite-plates are unsealed and removed.

REGISTERING CUSP PLANE ANGLES

The guide planes are released and the condyle adjusting screw on the right side turned to the right, the case assuming a lateral position. The cusp planes of the natural teeth pass one another at a certain definite angle and this is the angle we want to register. Before the teeth are out of contact the lateral movement is stopped and the guide plane on that side adjusted to the incisor guide pin. A notation of the degree of this angle is made and the case returned to the rest position. The same procedure is then carried out on the opposite side and the guide planes locked in the indicated positions. The bite is now opened one-tenth of a millimeter and we are ready to grind. Opening the bite this distance prevents destruction of the natural cusp planes and will allow the case to settle in the mouth. A fairly long porcelain tooth is selected for the case and the cusp planes ground to correspond with the angles of the guide planes which are set to the angles of the natural teeth.

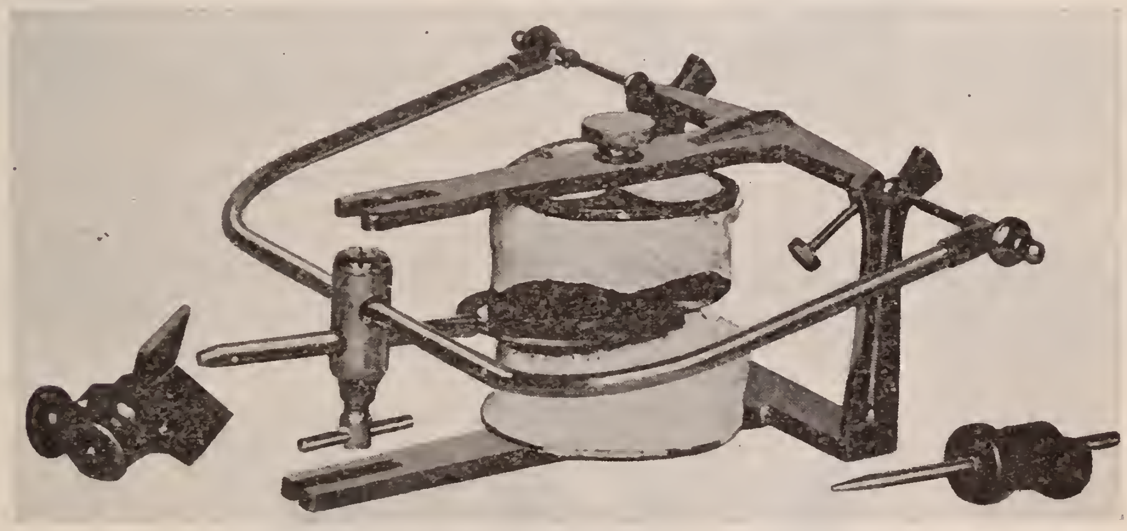

Fig. 5

Fig. 5—Mounting with Face-bow. Guide-plane unit and guide-pin unit removed from instrument. Face-bow fork is inserted in bite plate parallel to a line from ear to eye, then set in articulator parallel to the upper bow which is horizontal.

FULL UPPERS AGAINST NATURAL LOWERS

A good impression of the natural teeth should be taken and a true cast poured. A trial bite-plate fitted and the bite obtained. The face-bow should be used to transfer the case from the mouth to the articulator. A ten-gauge wire one inch in length is bent in the form of a V and inserted in the occlusal plane of the wax bite-plate so that the apex of the wire will rest in the sulci of one of the lower molars. The incisor guide pin is now adjusted to the guide planes which are in a horizontal position. The condyle adjusting screw on one side is turned to the right, the case assuming a lateral position the incisor guide pin will be raised according to the degree of inclination of the cusp plane of the natural teeth. The guide plane on that side is adjusted to the incisor guide pin and the inclination noted.

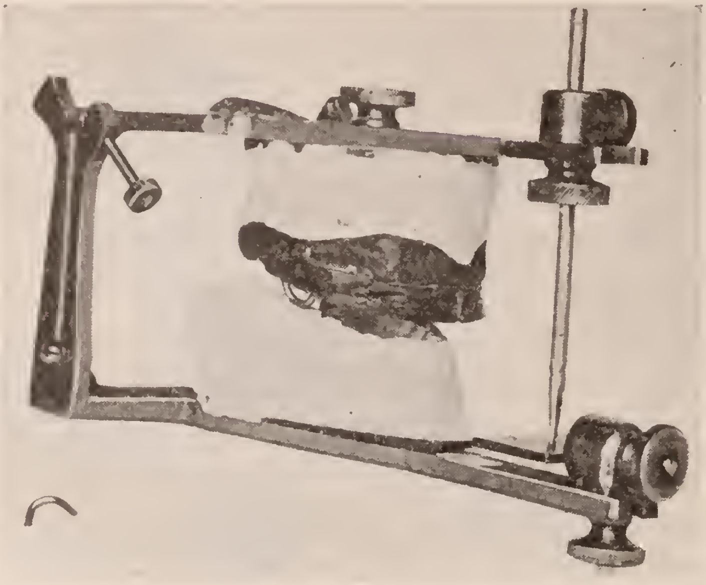

Fig. 6

Fig. 6—Full Upper Against Natural Lower. Ready to register cusp planes. The V shaped wire is set in occlusal plane of the bite plate, the apex resting in sulci of natural molar—guide planes in horizontal position, guide pin resting thereon. Turning condyle adjusting screw to right causes case to assume a lateral position.

The case is returned to the rest position and the same procedure then carried out on the opposite side and the guide planes locked in the indicated positions. That portion of the wax ridge from the median line to the first bicuspid and from the occlusal plane to the high lip line is

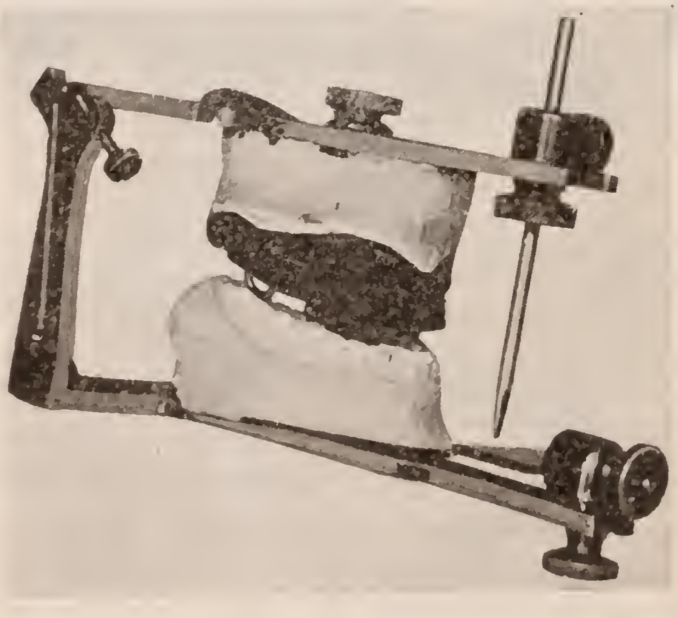

Fig. 7

Fig. 7—Full Upper, Natural Lower. Case in lateral position. The V wire has followed the natural cusp plane of the lower molar. The guide pin has raised at same angle. The guide plane on that side is now raised to contact with guide pin and degree of angle noted.

cut out and the condyle adjusting screw turned to the right, the case assuming a lateral position.

The central, lateral and cuspid are now set end to end with the natural teeth. The same procedure is then carried out in the opposite lateral position.

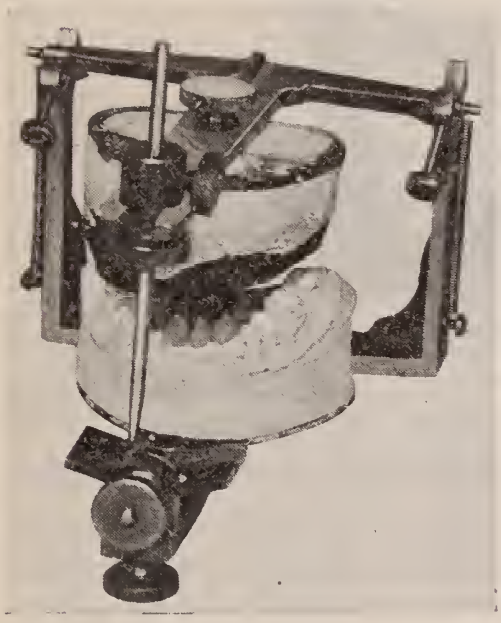

Fig. 8

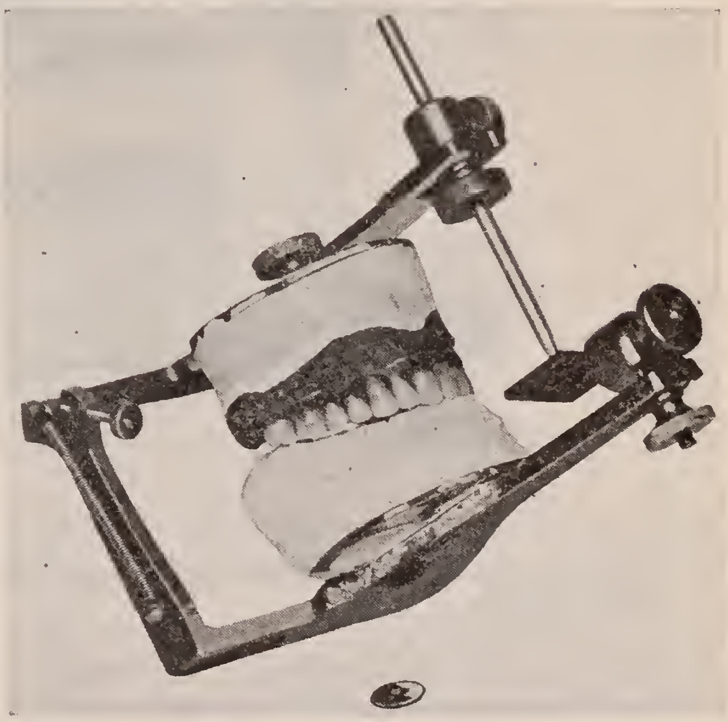

Fig. 9

Fig. 8—Full Upper, Natural Lower. Setting up the anterior teeth. The median line having been marked on the bite plate. The case is put in a lateral position and the three anterior porcelain teeth set end-to-end with the natural lowers. Same procedure on opposite side. Resulting in only antero-posterior position for efficiency—proper over-bite and esthetic irregularity of incisal line.

Fig. 9—Full Upper, Natural Lower. Showing balanced bite in lateral position, right. side. N.B. Left central in contact, right second molar in contact, food space between.

Setting the six anterior teeth in this manner results in three very necessary things, two of which are done without conscious effort.

Not only are these teeth in the only antero-posterior position at which maximum efficiency can be expected, but also are established in the only over-bite possible in the given case and the slight irregularity of incisal line is desirable for esthetic reasons.

FULL DENTURES

That the face-bow is necessary in mounting partial cases I have proven to my own satisfaction. I therefore assume that it is equally necessary in full denture work always providing one wishes to approximate the ideal of nature. The incisor guide pin and the guide planes are removed from the bows of the instrument and the case mounted in the usual manner. The guide planes may be set at any angle desired.

In the average case on this instrument the guide planes are set to the long lines of the graduated scale or twenty degrees.

This is an average determined by measuring a number of patients of from forty to fifty-five years of age.

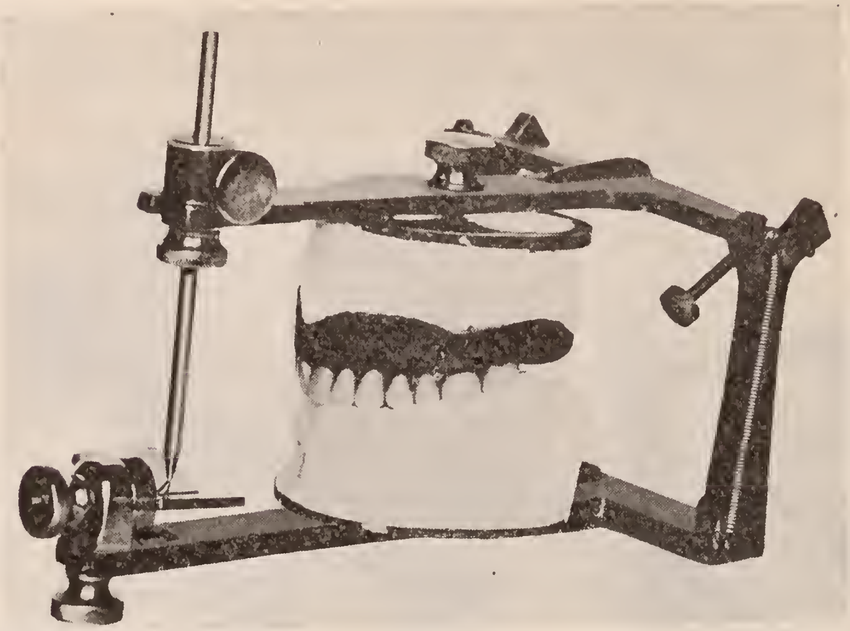

Fig. 10

Fig. 10—Full Upper, Natural Lower. Same position as in Fig. 9, showing contact in balancing bite, left side.

When a patient presents with a few teeth that must be extracted and full dentures made, impressions of the case are taken, casts poured, bite-plates made and the case mounted.

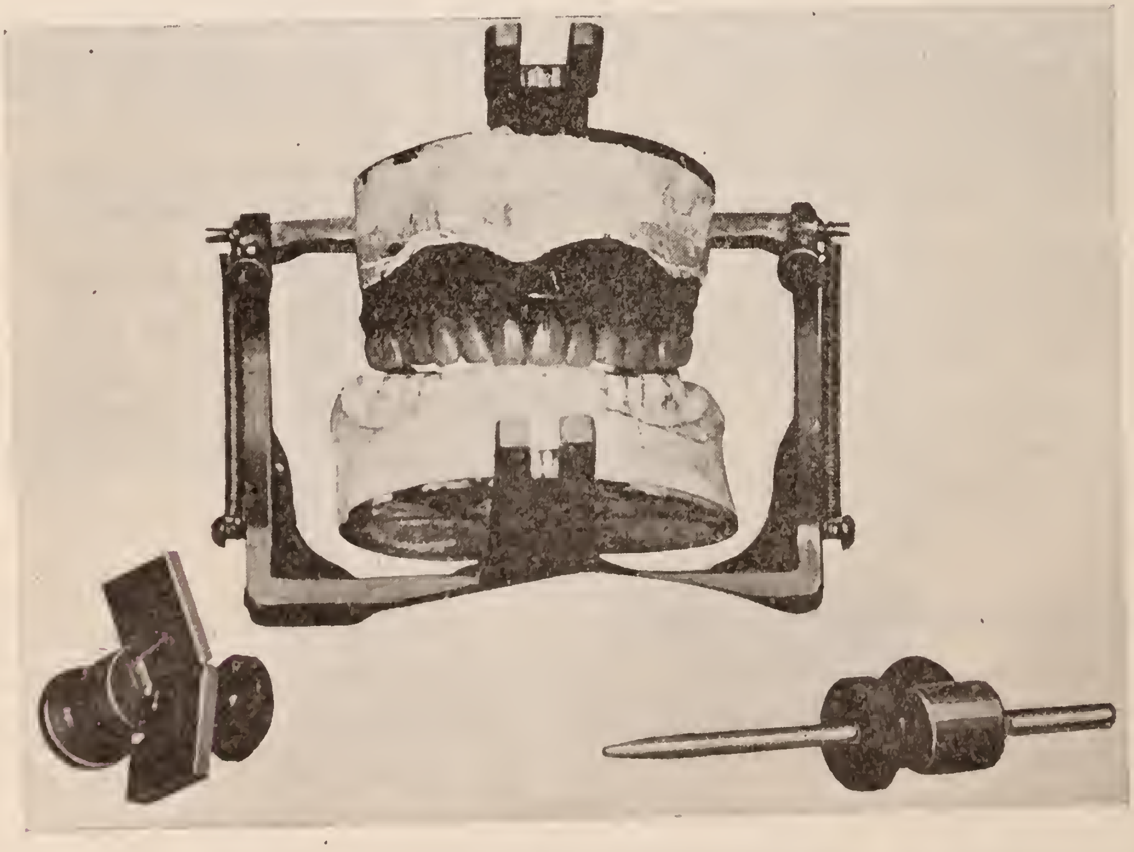

Fig. 11

Fig. 11—Full Upper, Natural Lower. Balanced bite in end-to-end position. N.B. Incisors in contact, right and left second molars in contact, food spaces on both sides.

A record of the inclination of the cusp planes of these natural teeth are made on the patient's chart.

The teeth are then extracted and the patient dismissed. When the patient returns for dentures the guide planes are set to the charted angles of the natural teeth and the restoration ground to these angles.

As we have made an accurate record of the inclination of the cusp planes of the natural teeth and as the condyle paths are established by these it follows that there will be no necessity of the condyles adapting themselves to new paths.

CROWN AND BRIDGE WORK

The technic for Crown and Bridge Work varies but little from that of partial dentures and is easily developed by the individual.

While this instrument originally was designed to allow the operator to obtain maximum articulation in all abnormal cases, we find after some experience that should one find a normal occlusion on one side of the mouth and desire to restore the abnormal side to correspond with the normal side this may be done with ease.

Since the angle at which the guide planes are set determine a certain definite occlusal plane, compensating curve or the "curve of spee," it necessarily follows that if the guide plane on the normal side is set at thirty degrees (the compensating curve at that side being considered normal), to obtain the normal on the opposite side necessitates the guide plane on that opposite side at thirty degrees also.

PROCEDURE

The inclination of the natural cusp planes on the normal side are registered. Then the guide plane on the opposite side is set at the same degree of inclination. By placing the case in a lateral position you can see just how much abnormality exists.

If you build your restoration to articulate (with the guide planes in these positions) you will restore the abnormal occlusal plane to the normal, because to articulate the restoration you must arrange and grind the restoration on the certain occlusal plane which is determined by the angle at which the guide plane is set.

517 Syndicate Building.

An ounce of business judgment is worth a ton of statistics; for conditions usually change while you are lookin' at the statistics they represent.

RETENTION OF BRIDGES AND PARTIAL DENTURES BY PARTIAL AND FULL CLASPS*

BY J. W. BEACH, BUFFALO, N. Y.

THE MOST apathetic practitioner of dentistry today must realize that a great metamorphosis is taking place in the requirements and methods of dentistry.

We have come abruptly to a parting of the ways where time-worn and moss-grown theories and conceptions must give way to the new order of things. We are obliged to discard, trim and revise until scarce a semblance of former methods and procedures now remain. This condition is due not only to common sense and practical reasoning, but the shock of the battle has jarred us into an entirely different frame of mind.

Illusive theory and day dreams have been supplanted by work and actuality, and every minute of time must be given to the accomplishment of practical results. Therefore, I feel justified in presenting a few details in connection with a certain means of supplying large restorations, particularly for our soldiers who return to us in need of such service. For this reason only do I feel that I have a right to deal with the subject at this time.

I will not enter into a pre-discussion of accepted and recognized methods of bridgework, as the thoughts I wish to present appertain to the specific object I have mentioned, and not to a distinct method for general adoption. Another object is that the thoughts presented may be further developed by others and thereby increase their application and enlarge the scope of usefulness. It will give me great pleasure and satisfaction if some idea presented may be utilized to the welfare, of even a few of those defenders of our flag who have been injured about the mouth and jaws in battle.

Support and retention for the pieces to be described is gained by use of clasp wires, utilizing the clasp, suspension and cantilever principles. These I have employed with more or less satisfaction for a period of sixteen years. All methods of clasping have thus far been held in varying degrees of disrepute and only recently has the advocate of the clasp been permitted to give favorable expression to his opinion before dental meetings. There are clasps, and then there are other clasps, all of which I may say are still in the developmental stage. The standard universal clasp is yet to be perfected.

The first thought that comes to the dentist in connection with the clasp is the ancient and ingrown idea that it brings positive and absolute destruction to contacting tooth surfaces. We gladly coincide with this view in relation to the old form of broad clasp but when round wire is employed which gives but a line of contact to enamel surface, the first instance of disintegration or actual injury is yet to be discovered by me. Again, no piece should be placed in the mouth which cannot be removed and cleansed by the patient, except in special cases. This fact is accepted generally by the profession.

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*Read before the Northern Ohio Dental Society, June, 1918.

The wires employed in this method are gauges 10 half-round base-wire; 13 half-round for occlusal rests and universal clasps; 14 round for universal and full clasps; 16 round for loop clasps and the interdigital wire. The interdigital wire is the only feature of the work for which I claim originality and has proven a most valuable factor in the success of many cases. I will describe its construction and use by the aid of pictures. The use of the occlusal rest or tang is a positive necessity in the construction of the universal clasp.

I am pleased to quote the opinion of Dr. H. J. Goslee, who says that we are justified in trimming the occlusal surface of the tooth which supports the rest, also, if necessary, it is permissible to trim the opposing point of contact in order to gain sufficient space. I feel now that my practice of years has met with due justification.

I wish to recommend for the consideration of the profession the splendid dissertation on the clasp and its application by Dr. Goslee, printed in the March, 1918, *Dental Items of Interest*, page 191. The paper and discussion comprises a sort of compendium on this subject by which the profession may be guided. Both Dr. Essig and Dr. Ottolengui contributed valuable ideas; however, I am convinced that the views expressed by Dr. Goslee are fundamentally correct.

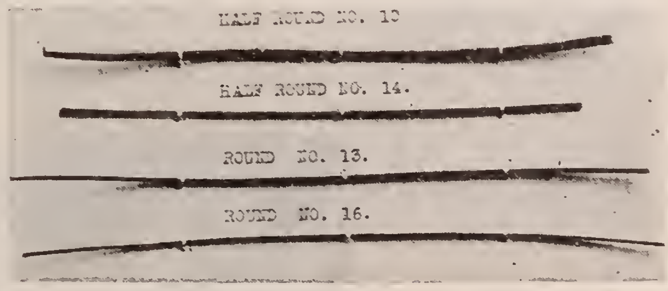

Fig. 1

The first illustration, (*Fig. 1*), shows the different wires employed which, in some cases, may be too large and should be reduced relatively by two sizes, making them 12, 14, 16, 18 or even 19 gauge for interdigital use.

Fig. 2, A, shows individual sections of interdigital wire, each having been bent to conform to the lingual surface and assembled at *B*. *C* shows universal clasp with occlusal or finger rest, also extension for support when rubber saddle is used. The base wire is represented at *D*, and

E shows all parts assembled, including on the left the full clasp of Jackson, which frequently may be employed to advantage in this method.

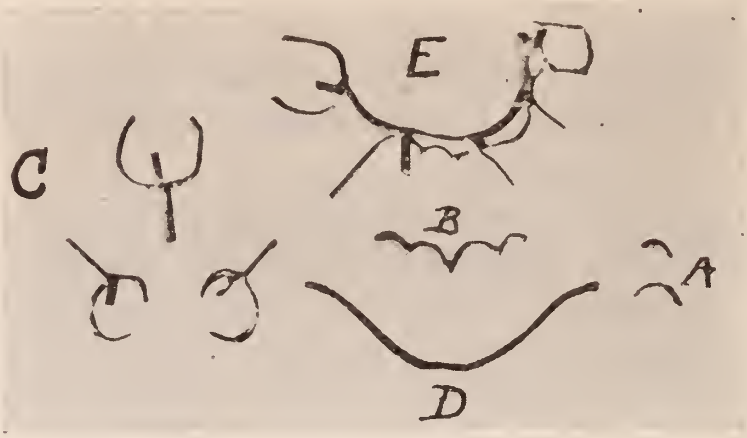

Fig. 2

A single tooth is shown in *Fig. 3*, being supported by two universal clasps. Although this form of appliance is not recommended for general use, it has its place and has proven a satisfactory means for hundreds of cases in my practice.

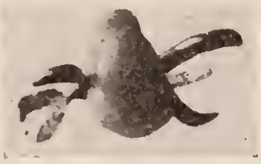

Fig. 3

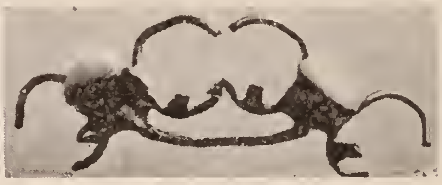

Fig. 4

Fig. 4 shows a unique construction whereby two laterals are carried, using 18-gauge round wire for the clasps and 14-gauge half-round for the connecting base wire. When the bridge was placed, it was found possible to shorten the labial extensions of the central clasps, thereby reducing display of metal to a minimum. A similar device has been used to carry inferior centrals or laterials, to great advantage.

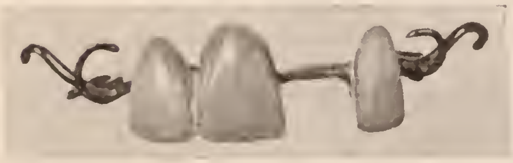

Fig. 5

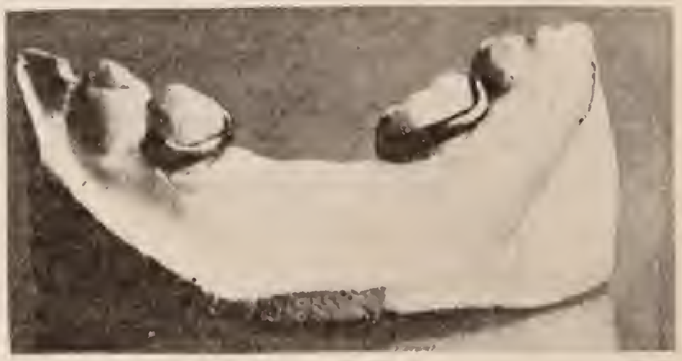

Fig. 6

Fig. 5 shows an unusual case in which natural separation between cuspid and first bicuspid on either side gave an opportunity to employ a double clasp attachment which furnished ample support for the supplied teeth.

Fig. 6 indicates relative position of clasps on buccal and lingual surfaces of the teeth, and *Fig. 7* is a view of a bridge showing the supporting clasps.

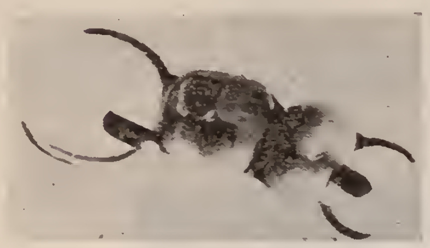

Fig. 7

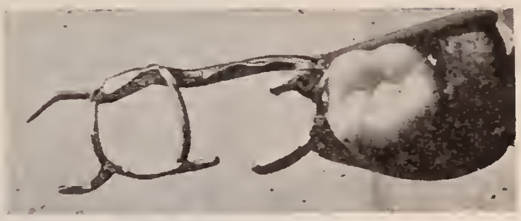

Fig. 8

Fig. 8 shows the universal and the full clasp connected by a base wire supporting a saddle which carries a lower molar supply. To the full, or Jackson clasp, is soldered short projections of No. 18 round wire to engage adjoining teeth in its support. The next piece (*Fig. 9*) is a similiar appliance carrying two molars. This is a practical means of overcoming a difficult condition to remedy by other methods.

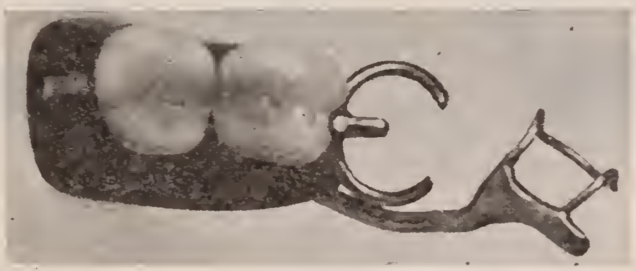

Fig. 9

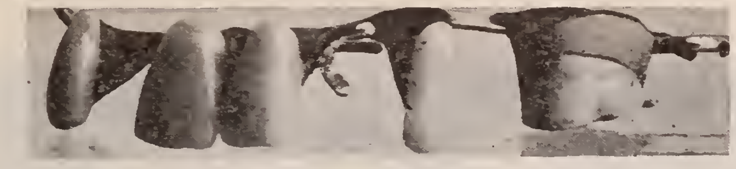

Fig. 10

Figs. 10 and 11 show a practical case which speaks for itself, as it were; this has been worn several years with great satisfaction.

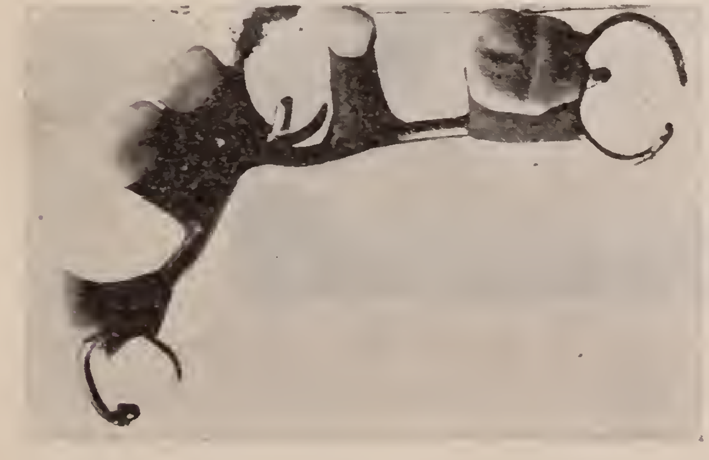

Fig 11

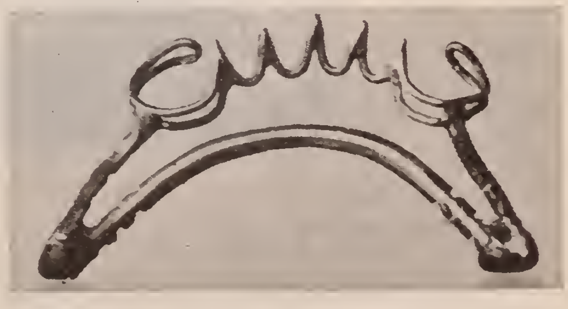

Fig. 12

Fig. 12 illustrates the construction of the framework for supporting a lower interdigital piece supplying the bicuspids and molars on both sides. The loop clasp advocated by Dr. Roach is used in this case, being made of 18-gauge round wire. This form of clasp should be used wherever possible. A minimum amount of solder (18 k) is always used in attaching the separate pieces in interdigital construction.

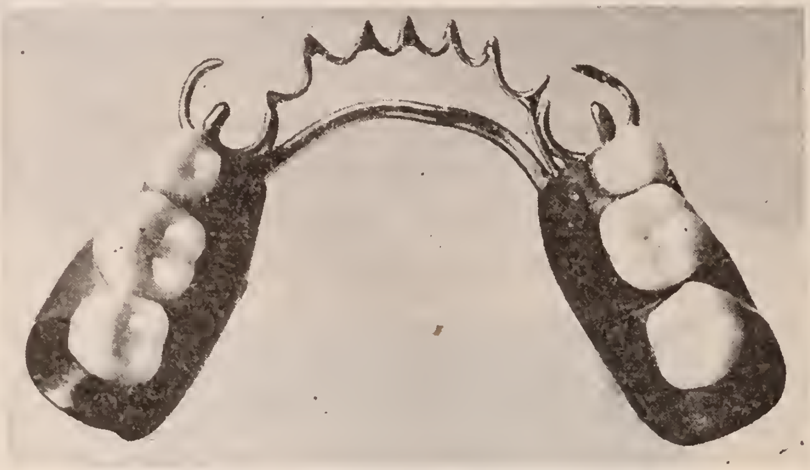

Fig. 13

Fig. 13 shows a completed lower piece after this method. The objects gained from the interdigital wire are: *First,* it prevents heel raising; *second,* it brings each tooth equally into the support of the piece; *third,* it forms a splint for loose teeth and *fourth,* its presence near the gum line positively prevents the deposit of salivary calculus.

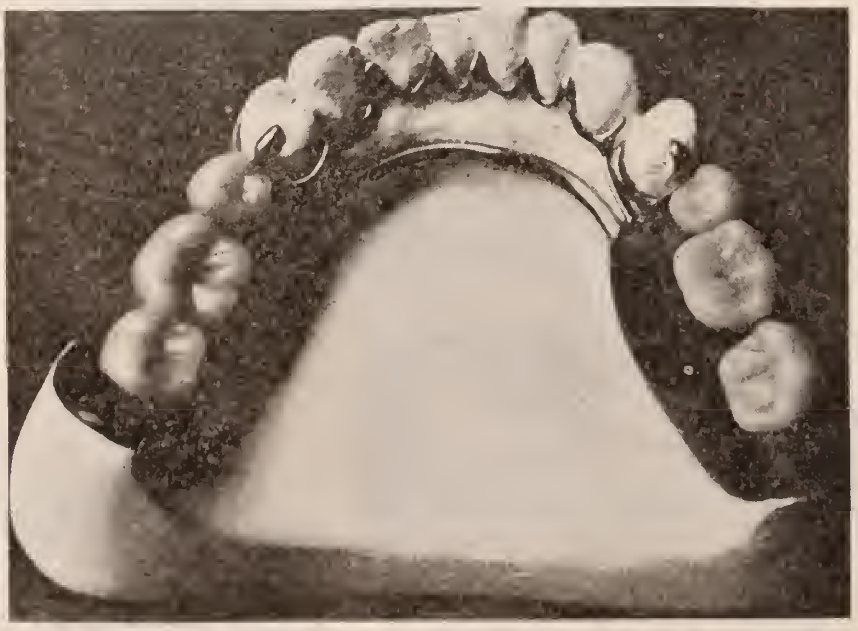

Fig. 14

Fig. 14 shows the same piece from which may be derived an idea of the position of the interdigital wire on the lingual surfaces of the teeth.

Figs. 15 and 16 show the same idea applied to the upper jaw and need no comment to suggest the practical nature of the method which may be utilized in innumerable ways, dependent upon the ingenuity of the individual dentist. It is the hope of the writer that some practical benefit may come to our returned defenders through its application. A few of the illustrations used appeared in an article* in THE DENTAL SUMMARY some time ago, however, they illustrate the method so well that we feel justified in using them again.

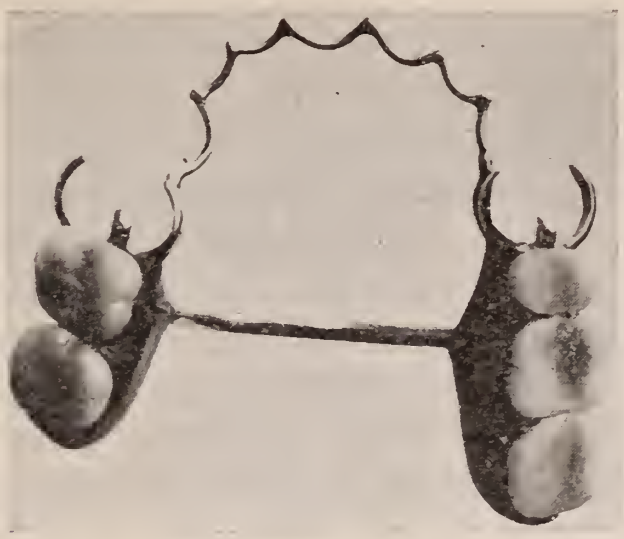

Fig. 15

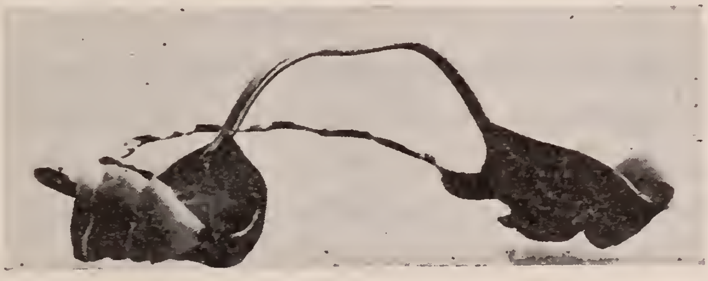

Fig. 16

131 Allen Street.

A Missouri farmer went to a general store keeper, an old friend, to buy a buggy. It was priced at $90, and the farmer said his father, twenty years ago, bought one just like it for $60. The merchant looked up the record of the sale and found that the father had turned in 300 bushels of corn for that buggy. He told the son to deliver to him 300 bushels of corn and he would give him a $90 buggy, $75 wagon, $20 suit of clothes, $20 dress, $5 baby dress, $5 crib, $3 worth of candy, $10 worth of sugar, $10 worth of tea, $100 worth of gasoline, and $15 worth of lubricating oil. The total figure, $353, is the present value of 300 bushels of corn. The farmer concluded to pay cash for the buggy.

THE INDIRECT METHOD.*

BY WILLIS A. COSTON, D.D.S., TOPEKA, KANSAS.

SINCE THE INTRODUCTION of the cast gold inlay to the dental profession a few years ago, it has largely taken the place of the gold-foil filling and has made possible the filling and restoring of many broken-down and decayed teeth that would have been quite impracticable under the old method, and has made it possible to fill the ordinary cavity with much more ease to both dentist and patient in a fairly durable manner. It will take a number of years of experience yet to determine whether the inlay is as good a tooth-saver as the foil filling, if it ever can be demonstrated, which the writer doubts.

The cast filling, however, has saved in comfort many teeth for a period of years and has prevented thousands of cases of backache, nervous and physical prostration, and has, in fact, made the practice of dentistry much easier and pleasanter than it was before for both patient and dentist.

Dr. Taggart and his followers have developed a very fine technic, which, if followed, produces quite constant and very excellent results; as far, however, as the writer knows, no absolute knowledge exists as to the accuracy of adaption to the walls of the cavity.

We say that an inlay fits perfectly, which, of course, we do not believe, as perfection is not possible, and not discoverable or discernible, if possible. We do believe, however, that they can be made to fit approximately, say to within a few thousandths of an inch, maybe only one thousandth, which amount of leeway is probably necessary so that cement may be used between the inlay and cavity walls for the double purpose of filling the chink and preserving the dentin from decay. So we must not talk of perfect-fitting inlays, because, in the first place, perfection is not possible; in the second place, we could not recognize it if it were attained; and again, if it were attained, we could not properly seat our inlay, as the cement is supposed to occupy about one-thousandth of an inch space, and hence an inlay is not good because of perfection in fit, but rather because of its slight imperfection which makes it possible to cement it into the cavity, forcing it approximately to the seat designed without danger of splitting the tooth, which it would be very likely to do if it fitted the tooth accurately. And the slight imperfection is unquestionably shrinkage, which, if not scientifically demonstrated as an inherent physical characteristic of gold, has been many times clinically demonstrated; for instance, inlays may be and are cast hundreds of times daily, that with but little trimming and force may be satisfactorily seated, but overlays, bands, rings, crowns, cast in the same way are almost impossible to be forced into place. So manifest is this shrinkage that it is fatal, from the viewpoint of many men who make telescoping crowns, as the Peeso, to cast the contour over a strong 28-gauge coin gold telescoping band with the cap sweated on it, because it will not go to place after such casting.

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*This paper includes the technic of the clinic given at the Northern Ohio Dental Society, June, 1918.

Not only does the probable shrinkage inhibit perfection, but our human limitations, the possibility of slight changes in the investing material, in the drying and wax-evaporating process, in changes of temperature, may also be modifying factors.

If the foregoing theories are true, and perfection is not attainable, then the method that promises *good* results, that entails the infliction of less discomfort to the patient and makes the work easier for the dentist and more definite, should be recognized as a desirable addition to the usual methods. However, even if I believed in the perfection of the cast gold inlay, I would contend that perfection is more nearly possible by the indirect than by the direct method. Any man who has developed a technic that produces an inlay perfectly satisfactory to himself, would be very unwise to change it, and I am not attempting to proselyte, but am giving what, in my hands, from my viewpoint and with my limited ability, gives the best result. With this explanatory preamble, the principal reason for which is to impress upon you that, from the light given me, perfection is unattainable, we will take up the consideration of the indirect method.

Our aim is, of course, to make the best stopping possible for the cavity of decay and restoration of lost contour. And in order to present the subject I will first consider several obstacles which may interfere with or prevent accuracy by the direct method of making wax models for the cavity, in the tooth, in the mouth. We see much beautiful and very accurate work made by the direct method in technic teeth *out of the mouth,* on the bench, unhampered by the conditions which prevail in the mouth; but the correct definition of the direct method, I take it, is the making of a wax model, that is, adapting the wax to the walls of the cavity in the tooth in the mouth, carving and trimming it to practical completion, then removing and casting; while the indirect method is making the wax model entirely out of and away from the mouth, casting and finishing even to its final polishing.

The obstacles are (as compared to the indirect method), inaccessibility, poor light, lips, tongue, saliva. The many times unease of the patient, the possibility of distortion in taking the bite; carving, occlusally, as well as buccally and lingually and cervically, any or all of these.

And it is sometimes hard to see, unless one's eyes are very sharp, a slight rocking or displacement of the wax in the cavity, due to carving and manipulating, when the chink or crevice is filled with saliva, which any one of you will concede who have made inlays out of the mouth. Then when it is transmuted into gold and seated in the cavity, it is quite problematical as to the fit at the invisible margins, such as the cervical, sometimes under the gum.

The finishing and polishing is done mostly in the tooth after the inlay is cemented into place, which is disagreeable to the patient, and sometimes difficult for the dentist. All of these features prevail, which do not obtain with the indirect method, and the result is not superior.

In describing the *modus operandi* of making an inlay, we will assume the cavity to be an M. O., or a D. O., which, after proper preparation (which does not differ from cavity-formation by the direct method), a substantial matrix is loosely adapted and held in place by a wedge, to prevent the modelling compound from being forced into the interdental space. Then a piece of modelling compound—pencil shaped and larger in diameter than the greatest diameter of the cavity—is thoroughly warmed only on the sharpened or pencil-shaped end, which is introduced into the cavity; the balance being more rigid, acts as a plunger or piston, and, under strong pressure, forces the softened compound into intimate, if not absolute contact with all surfaces of the cavity, *when confined to the desired area with a matrix or band,* preventing its flowing into the interproximal space or out around the cavity walls more than is designed, which matrix or band is removed with the compound (when chilled), and is, in fact, a part of the impression.

As no carving or trimming of any sort is done to this impression before its removal, the probability of distortion or change in form is not great, if the shape of the cavity is such that it will "draw," and if due care is exercised. It is quite reasonable that such an impression will more nearly approach perfection than one made without a matrix, and which must be manipulated or carved before withdrawal.

The impression is then reinforced by being placed in plaster, which supports and strengthens any thin or weak portion and makes a cup or form into which to pack amalgam.

After the plaster has set, copper amalgam or any other amalgam may be packed therein. The modelling compound, thoroughly cold, supported by the hard plaster, permits of considerable force, so that the amalgam can be thoroughly condensed. Very soft amalgam is used, especially for the major part of the filling, when the mercury may be expressed from the rest and packed until a first-class product results.

The resulting amalgam model should be, and is in fact, a very close duplicate in form of the cavity, including lingual, buccal and gingival walls, as well as the occlusal surface. Any material difference in form, granting good technic, would be from the change or condition due to the crystallization of the amalgam, and we are assured that there is none, and we know by clinical experience that, if any, it is negligible.

Copper amalgam is used in my office because of the economy, as it may be used over many times, and principally because it seems to make the best model. Now if the amalgam model is a duplicate in form of the cavity and surrounding walls, all difficulties about closely adapting wax to all the walls of the cavity, including the gingival margin, have disappeared, as we can hold it up in the light while sitting comfortably on a stool in the laboratory, sans lips, tongue, saliva, cheeks, vitality. We can examine it under a magnifying glass to discover rocking (and sometimes can succeed), to get the proximal and occlusal contact, an ordinary bite may be taken, and the amalgam model placed therein, mounted on a crown articulator, when the occlusion and proximal contact can be obtained with as much accuracy as they could be for a crown or bridge.

And not only is it an easy matter to force a cone of soft wax into the depest recess of a cavity, but the wax can be extended to a feather edge over every margin, all in plain sight; the marginal occlusal ridges, the sulci and fissures can be carved to suit.

We need no argument to convince anybody that such carving can be more easily accomplished under such conditions than in the mouth. Even then many mistakes are manifest.

It can be removed from the model by attaching the sprue wire to the occlusal surface in the most favorable place, and carefully lifted out, invested and cast in the usual manner.

After the inlay is cast, it is cut from the nugget of gold, leaving enough of the sprue on the inlay to grasp with pliers. All investment is removed from it, preferably by immersing for an hour or so in hydrofluoric acid. All globules and imperfections are removed under a magnifier, and the inlay placed back into the amalgam model (where it won't go to place), as far as it will go without force. Then wrap in a paper and place it in a plane cylinder swedge between two good thick pads of unvulcanized rubber, and carrying to a block, drive the plunger in, with a heavy blow or blows with a hammer; the rubber under the extreme pressure flows all around the model, supporting it against fractures, and the inlay usually is forced to place.

Inlays that apparently will not go half way to place without swedging usually can be driven home without fracturing the amalgam model, providing good-size models are made; and by using copper amalgam one can be very prodigal, as it can be used over many times without much deterioration. Such deterioration is caused by dirt, plaster and modelling compound being mixed with it, which can be cleaned out by rubbing the soft amalgam thoroughly in the mortar in an alcohol bath several times.

After swedging the inlay to place it is trimmed roughly and tried in the cavity of the tooth itself for proximal contact. When this is correct it is replaced in model, the sprue is removed and the occlusal surface (where the sprue was attached), is trimmed, then replaced in the tooth for testing occlusal contact. When correct it is replaced in amalgam model and finished completely. Usually an inlay so made slips easily without friction to its place in the tooth as an inlay should; and the fact that one is hard to force to place is almost conclusive evidence that it does not properly fit, as, for instance, a globule or two of gold on its surface will cause it to stick very tightly or make it impossible to be driven home, but is no evidence of a good adaptation. In swedging, small globules actually are flattened out or rubbed off and all the strain of forcing to place is in the model and not in the natural tooth.

It is much better that an ill fitting inlay break a piece of amalgam and the process be gone all over again than that it split a natural tooth and possibly ruin it, and such things have happened. And so in this paper and the clinic to follow a method is advised that is sane and safe, where forcing an inlay to place does not endanger the natural tooth—when all grinding, sand papering and finishing is done out of the mouth; but it does not claim to attain perfection.

No power endures,
No unalloyed success,
Bought at the price
Of anyone's distress.

NITROUS OXID ANESTHESIA AND ANALGESIA IN DENTISTRY.*

BY VAN BROADUS DALTON, D.D.S., CINCINNATI, O.

THE TITLE OF THE PAPER which I shall present to you this evening probably would have been more expressive of its contents had I dubbed it "Analgesia Error," since it is my purpose to take exception to the ever-growing practice of general practitioners of dentistry in the use of nitrous oxid analgesia in their daily work.

Analgesia in its relation to anesthesia is inseparable. Therefore, in order to best discuss the subject, let us first define the stages of anesthesia. In this way only can we realize the inseparable relationship of the two.

Analgesia is nothing more than a stage of anesthesia and borders closely on to the most dangerous stage at that, as I will try to show later on. Yet every day general practitioners subject some of their patients to this stage of anesthesia, which is fraught with so many dangers and liabilities. But what is worse, they are kept in this state for a considerable length of time.

To operate on sensitive teeth of nervous patients (and these are the ones for whom analgesia is supposed to be such a boon), is a most dangerous practice.

I say this not with the purpose of appearing as an extremist, but in all seriousness I make this statement, after having had the experience of over fourteen thousand cases of nitrous oxid anesthesia and analgesia administrations.

The anesthetist knows that it a dangerous thing for a surgeon to perform even a minor operation unless the patient is surgically anesthetized — that is, if the patient is under the influence of a general anesthetic.

Many patients have failed to survive operations (not because of the operations, and not necessarily because of physical pain), but because of shock. Shock because of operating too soon or of operating too long; shock because of operating before the patient is surgically anesthetized, or of operating after the patient has begun to reach a state of semi-consciousness.

There are three distinct stages of anesthesia, and no one should take the responsibility of administering a general anesthetic without being familiar with these stages and of anesthetic symptoms. These stages overlap each other, but they have certain distinguishing characteristics.

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* Read before the Cincinnati Dental Society, 1917.

The first effect of nitrous oxid gas is stimulating, rapidly followed by delusions, excessive ideation and hallucinations. In producing analgesia this is the condition of your patient. It is the borderland between stages one and two, that is, the state where everything is magnified, and bordering closely onto the second stage, which is that of light anesthesia. You have to make the patients walk the tight rope, so to speak, a feat very difficult to accomplish, for they are very liable to fall, on the one side into full consciousness, thereby feeling the pain of the operation, or of falling on the other side into light anesthesia, exposing the patient to shock, should the operator in the excavation of a cavity get in close proximity to the pulp.

I once asked a salesman who was demonstrating the merits of a certain machine for producing analgesia, what was the cause of cold perspiration breaking out on a patient's forehead in analgesia. He replied that it was because of uneven mixture of the gases. Experience has proven to me that such a condition is brought about by fright, and not as stated by the salesman. Not that patients are really hurt, but being in this analgesic state, things are so magnified that they are afraid; and let me say here that this condition, although it be purely psychical. is fraught with as much danger of shock to the patient, with all of its dread consequences, as though the patient was suffering real physical pain.

It is just as necessary to relieve this fear, this psychic condition of the patient, as it is to prevent physical suffering, for they both have the same deleterious influence, in that they use up the neurons and thereby cause exhaustion of the medullary centers.

I often have administered nitrous oxid to the stage of surgical anesthesia for the extraction of loose roots of teeth, and teeth loosened through the ravages of pyorrhea, because the patient in question dreaded to have the extraction done unless they were first rendered unconscious; and I believe it is a good practice to surgically anesthetize such patients and relieve their fears, thereby conserving nervous energy instead of using it up to a point of exhaustion.

Then too, granted that analgesia is a safe state in which to keep a patient. the general practitioner is attempting too much when he essays the role of anesthetist, surgeon and nurse. It is physically impossible to give the patient the necessary attention from the standpoint of the anesthetist and at the same time concentrate one's mind upon and execute the operation in hand.

Many patients in our hospitals have been allowed to go down under the influence of an anesthetic too deeply or come out from under the stage of surgical anesthesia (third stage) suffering shock and sometimes death because an interne became too absorbed in the operation.

The anesthetist never should allow his attention to be diverted from his patient, never should attempt to do anything but administer the anesthetic, and tell the surgeon when to commence and when to cease operating. This applies to prolonged operations, where operations are being performed while the patient is still inhaling an anesthetic, and does not apply where an anesthetist surgically anesthetizes a patient, removing the inhaler as soon as the state of surgical anesthesia is established, and then instantly ceases to be an anesthetist, becomes a surgeon and extracts a tooth or makes multiple extractions in favorable cases where necessary, after which he again as quickly becomes an anesthetist and cares for the patients until they regain consciousness and self-control. While such operators do more than one thing, the point I wish to make is that they do only one thing at a time. I have kept patients surgically anesthetized anywhere from ten to sixty minutes with nitrous oxid and oxygen, but never did I attempt to operate for such patients. Likewise, I have kept patients in the analgesic state anywhwere from five to thirty minutes while another was operating, and let me say that this is a more difficult feat to accomplish than is that of maintaining surgical anesthesia.

If it is true that the surgeon should not commence an operation before a patient is surgically anesthetized, and that he should cease operating before a patient begins to come out from under the influence of the anesthetic. I believe that it is equally true that no operation which would otherwise be painful should be performed while a patient is in the analgesic state, for fear of shock.

You ask me then, What shall we do with our nitrous oxid machines? Throw them away?

To this I would say "certainly not." Use them in the right way. Surgically anesthetize your patients for cutting retentions and otherwise shaping of sensitive cavities. This can be done with greater ease and more quickly and your patients, as well as your own energy is conserved; and the after effects are less than where a patient is kept in the analgesic state for ten or fifteen minutes. Not only that, but the danger to the patient is much less. Pulp extirpation can not be painlessly done while the patient is in the analgesic state anyway, notwithstanding the claims of some operators to the contrary. I have witnessed demonstrations where pulps were removed while the patient was supposed to be in a state of analgesia, but to my certain knowledge in every case where the patients evidenced no pain they were surgically anesthetized.

In order to painlessly extract a tooth under nitrous oxid it is necessary to have the patient deeply anesthetized, as the exertion necessary in a difficult extraction is sufficient to arouse a patient to a partial state of consciousness unless they are surgically anesthetized. Should the patient lapse back into unconsciousness they will not remember having felt any pain, but should they remain conscious of course they will remember having suffered pain.

Nitrous oxid always should be administered with an admixture of air or oxygen. preferably the latter, gradually decreasing the amount of air or oxygen until the patient is fairly well under the influence of the anesthetic; then administer pure nitrous oxid until the patient is surgically anesthetized. In this way there is very little if any change in the blood pressure and the color of the face does not change.

Patients anesthetized by a quick adaptation of the inhaler with the exclusion of all air or oxygen, being allowed to breathe only pure nitrous oxid from the beginning, always become more or less cyanosed. jactition is nearly always present, asphyxial tendencies intervene before deep anesthesia is reached: consequently an unsatisfactory narcosis is reached and the available working period of anesthesia is of much shorter duration. The blood pressure is greater also.

Before administering an anesthetic patients should not be instructed how to breathe. The least said in the way of instructing patients about breathing. the better. Those who are accustomed to shallow breathing, if told to breathe deeply inhaling nitrous oxid to the exclusion of all air or oxygen, the effect is almost equal to a sudden blow on the head. I do not mean to say that deep breathing is not beneficial, for patients who are accustomed to deep breathing are more easily anesthetized. But during the administration of an anesthetic is no time to try to change one's habits of breathing.

It is needless to say that quietness should be maintained during the administration of any general anesthetic. The operation of the gas machine by the assistant should be controlled by means of signs.

It is not my purpose to take up the subject of the selection of anesthetics. All of you know that we are told not to give chloroform in cases of heart lesions, nor ether in cases of diseases of the lungs, or nitrous oxid in cases of high blood pressure. Unfortunately for the anesthetist, our patients are not divided into these groups. one having a strong heart and weak lungs. and *vice versa*, etc.; often a patient suffering with an impairment of a lung and kidney will react favorably to the inhalation of an anesthetic.

Consideration of the operation to be performed in the choice of an anesthetic is an important matter, and in conclusion let me add that nitrous oxid for extracting is probably the best anesthetic in the majority of cases, but there are extractions which should not be undertaken under nitrous oxid anesthesia, just as there are cases of extraction which should not be attempted under a local anesthetic.

In the extraction of impacted teeth, especially impacted lower third molars, nitrous oxid is not a suitable anesthetic. This does not apply to unerupted or partially-erupted lower third molars giving trouble as a result of irritation through pressure from the opposing teeth. Nitrous oxid is indicated in the extraction of abscessed teeth and teeth where the gums are sore and infected.

Conductive anesthesia and local anesthesia by cocain or novocain may be used safely where the gum and mucous tissue at the site of injection are in a healthy state. Unfortunately, conditions of this kind requiring extraction are few. It is certainly a most dangerous thing to make an injection of any local anesthetic mixture into gum tissue that is bathed in pus. It is my belief that most cases of blood poisoning following extractions have been due not to the extraction, but to the injection of a local anesthetic mixture into already infected gum tissue. Unfortunately, this has caused the belief among the laity, and some dentists and physicians as well, that a tooth should not be extracted while in a state of abscess. Much suffering has been caused and many cases of bone diseases, such as necrosis and osteomyelitis as well as diseases of the periosteum have been caused by this erroneous theory.

4 W. 7th St.

ABSTRACT OF DISCUSSION

Dr. Francis X. Siegel—Before I undertake to discuss this very interesting paper, I desire to say that most of my experiences with nitrous-oxid and oxygen have been with deep anesthesia, ranging from five minutes' duration up to four hours. I would define "analgesia," therefore, as the means of relieving pain without deep anesthesia. Contrary to the doctor's opinion, I would say that the third and deep stage of anesthesia requires the most constant and careful attention, particularly so in operations about the mouth. When deep anesthesia is desired for any length of time, the dentist should not be anesthetist and operator at the same time, but should have a competent man to administer the gas for him.

In both analgesia and anesthesia, I always prepare the patient with preanesthetic suggestions. These mental suggestions which I employ have a variation from a minor degree of hypnosis to a deep stage of hypnosis, before the anesthetic has taken its full effect. To obtain a satisfactory analgesia you must use suggestions: not only before the gas is administered, but also during the time of its administration. If the proper preliminary suggestions are employed you can impress your patient most wonderfully and give him additional confidence in your ability. By telling a patient what you are going to do and how the anesthetic acts, you divert his attention and allay his fears. If you wish to make these suggestions more impressive place your hand upon the forehead or the cheek and with a few light strokes, assure him again of his safety and your watchfulness over him while he is asleep. The sense of touch is an additional factor in diverting the attention from that great element of fear. When you have accomplished these things you can take a patient through analgesia with a minimum amount of anesthetic and with a greater degree of safety. This also holds true in the production of deep anesthesia.

The factor of suggestion in dentistry with and without anesthesia is becoming more and more important, and I believe the day will come when suggestive therapeutics will become a part of the dental curriculum. It is already being adopted in the medical department of the Johns Hopkins' University.

Dr. Paul Cassidy—I had hoped this evening that I would be able to disagree with our essayist and so provide you with some amusement, if not instruction, and that I would not be called upon to use the thread-worn phrase that "I have enjoyed this most excellent paper which we have had presented to us tonight, and agree with the essayist in every respect." It was my wish that Dr. Dalton would take up some line of thought with enough error in it to permit of adverse criticism or, at least, that he would talk about something so far beyond my understanding that I would necessarily consider him wrong.

Unfortunately for the perverse nature of me, he has done neither and I can only say now that his views in the main are my own. I might add that the only real error I could find was in the use of the word "analgesia", and even for this he later apologizes and then defines his application of the term. And if he had not used "analgesia" as it has come to be used by some of us, we probably would not have known what he was talking about anyhow.

The word "analgesia" was first foisted upon an ever gullible dental profession by itinerant lecturers, subsidized by the manufacturers, who organized classes over the country to which they taught the theory and practice of a new panacea, which was to rob the art of dentistry of all its terrors and change it into a veritable orgy of delight. The ancient Greeks applied the word "analgesic" to any agent which brought about the relief of existing pain and it has been so used through all the centuries. It is derived from ana, meaning against and algesios, meaning pain. It remained for these pseudo scientists to apply the word to something wholly different and to describe by analgesia a stage of anesthesia, which state was only discovered in the year 1842, and which word as describing it was suggested by Oliver Wendell Holmes shortly thereafter. Anesthesia is applied to any state of the body in which the reception of sensation is inhibited, prevented. Relief, on the one hand, and prevention on the other, are wholly different things and not even consistent with one another.

And so this condition of partial anesthesia, born in ignorance and fostered by cupidity, was thrust out into a cold and unsympathetic world, to be nurtured and reared by us dentists.

Never did the old saw that "a little learning is a dangerous thing", apply more aptly than to anesthesia in all its stages. Our very ignorance of the matter in hand made us easy victims for the highbinders who took us to their hearts and for a remuneration, whispered in our ears the secrets of success, in five lessons.

Is it any wonder that all over the country in dental offices there is a trail of dust-covered, unused nitrous oxid machines, which were purchased in the full hope that they were to relieve the practice of dentistry of a large part of its cares? We are gullible, gentlemen, and, if I must say it, we are too modest. When someone who styles himself as from New York, or Chicago, or Squeedunk, comes into our midst and tells of how successful he always is with this, that or the other thing, we feel when we ourselves fail that the fault is entirely in us: that our mentor is vastly superior to us in every way and we seldom even suspect that he is a liar, which he probably is.

The practice of anesthesia is always difficult. The "tight-rope walking" of partial anesthesia to which our essayist has aptly referred, is the most difficult of all. When, added to this, we consider the fact that the very patients who demand most loudly and insistently that they be relieved of all pain during the preparation of cavities are the very hardest patients to anesthetize under any circumstances, we can realize somewhat the enormity of the task the average dentist, busy with many things, has undertaken, when he begins the administration of nitrous oxid and oxygen, partial anesthesia and, as the doctor has said, clothes himself in the robes of nurse, dentist, assistant and anesthetist all in one at the same time.

I will not quarrel with those who are successful with partial anesthesia in the general practice of dentistry, and there are some of them, even among us: but I am personally of one mind with the essayist and do not like it. I usually insist upon carrying the anesthesia on to the deep stage for this type of work and would no more expect to be operator and anesthetist, without expert assistance, than I would submit myself to another's hands, under the same circumstances and for the same purpose.

I might say that the man who has not a wholesome fear of all anesthesia is a fool. He who permits that fear to beset him, and still persists, is the greatest fool of all.

I would go one step farther than our essayist has and tell you Yes, that you should, if unsuccessful, throw away or give away your apparatus; if you can find someone else as gullible as yourself, sell it and consider yourself fortunate.

C. STANLEY SMITH —It is not my intention to detract from the value of "suggestion" in the preparation of patients for anesthesia as presented by Dr. Siegel, but would like to relate the following experience of one of our prominent colleagues who was endeavoring to quiet a very nervous patient, a woman, by stroking her forehead. His intention was misinterpreted, however, the patient thinking he was "getting gay" with her and in a quite peevish way, said, "Doctor, that's not at all necessary."

My experience with nitrous oxid and oxygen as an analgesic has been about as described by the essayist; a continuous under-and-over state that is not at all satisfactory, or comfortable. Another serious objection is the obstruction of the field by the inhaler. This is especially noticeable in patients with short upper lips. There is also a tendency to hurry your operation beyond a comfortable speed. I do not consider the essayist's claim of shock well taken, as a partial anesthesia is certain to reduce the sensibilities to an extent sufficient to prevent any severe shock to the patient. On the other hand we find many patients whose nervous systems are terribly shocked at the mere thought of their being rendered unconscious—a condition that the argument for surgical anesthesia as opposed to analgesia does not answer to our satisfaction.

The essayist's estimate of the operator who uses nitrous oxid as an analgesic is not quite fair, as he assumes that the operator does not know when the patient is in the proper condition to operate. I do not care how difficult the technic is of some of our operations, there are men in our profession who have mastered them and are employing them very successfully. Because a method is difficult is not sufficient reason that it should be condemned.

I agree most emphatically with essayist's idea that the operator should not give his own anesthetic, especially in analgesic work. There is a class of patients who invariably demand an anesthetic and who are least able to stand it; among whom are alcoholics, drug users, those with kidney lesions and perhaps some with an undiscovered aneurism. To these patients a general anesthetic is not a strictly safe procedure. In fact they are of much greater concern than the shock bougie suggested by the essayist.

HISTORY AND PROBLEMS OF DENTAL AMALGAM*

BY C. M. McCAULEY, D.D.S., DALLAS, TEXAS.

THE HISTORY of amalgam as a tooth filling material may be appropriately divided into three periods of time, namely:

First: Period of Darkness.
Second: Period of Dawn.
Third: Period of Light.

The period of darkness began with its illegitimate and ignoble birth about the year 1832, and extended to the early '50's when a few reputable men began to see its merit. Two Frenchmen came to New York to engage in the dental business about the year 1832, bringing with them a new tooth filling material which they chose to call "Royal Mineral Succedaneum."

This material whose name would indicate royal ancestry was simply filings of silver coins mixed with mercury. In its manipulation it worked very harshly and possessed very unsatisfactory setting and finishing qualities. In the hands of a good operator, such filling material could not produce results. Added to the faults which it possessed was the heavy burden of charlatan parentage. These Frenchmen were quacks of the first order, hence any of their offspring or even associates received neither consideration nor respect from the profession of New York The new filling material, introduced by them and afterwards called "Amalgam," suffered under the disrepute of these unscrupulous men, and so far as reputable men of the profession were concerned it received no attention except that of antagonism. It is likely that the strength of this antagonism is the force which kept amalgam from an untimely death. A few years later, however, it came to be used by some American dentists. Investigations were begun by some of our thinking men looking towards its improvement and as a result of this work the darkness which had surrounded its infant days became less intense and an occasional glimmer of light was seen.

Among the first men to begin lifting a dwarfy and disreputable youth from the depths of darkness and gloom and to carry him towards the dawn were John Tomes and Charles Tomes, who had discovered volume-change as one of the cardinal faults of amalgam. They worked during the late '50's and '60's, endeavoring to ascertain the cause and correct this most objectionable feature. While their efforts were noteworthy, nothing of definite value was learned or accomplished.

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*One of a symposium of essays on Amalgam read before the Kentucky State Dental Society, 1918.

Dr. J. Foster Flagg did a great deal of work during the '70's to improve amalgam. He discovered that the addition of tin to the fillings improved the working qualities. He also discovered that tin reduced the expansion of the filling and that if added in sufficient quantity it would cause shrinkage. He believed in amalgam and he spared no efforts to discover and make known all its merits and to so improve it as to eradicate its demerits. His investigations were made along clinical lines. He made alloy from many different formulæ, using tin and silver as the principal ingredients, and modifying these with different proportions of many other metals. Record was made of each formula and specimens for trial fillings sent to leading members of the profession with the request that fillings be made for patients and carefully watched for a period of five years. When results were sent in by these men they were tabulated with his own results from use of the same formulæ, and from these results he endeavored to ascertain the value of the different formulæ.

All of these efforts were praiseworthy in spite of the fact that little definite knowledge of the subject was acquired. He did point out some problems which supplied subject-matter for more advanced investigation. For example, he observed that fresh alloy acted differently from alloy a few weeks old. This was attributed to oxidation. (It will be noted that a recent spokesman for the profession still believes that to be true.) Here and there he lighted a lamp which served to blaze the path that led us from darkness into the dawn.

The good work of Dr. Thomas B. Hitchcock served to enlighten the way towards the evolution of this most remarkable filling material. His most notable effort was the building of a micrometer for measuring expansion and shrinkage. This instrument, while not satisfactory, was the best produced up to that time.

It was at this stage of the situation, just previous to the year 1895, that Dr. G. V. Black began the study of amalgam. Literature of the day and previous was searched by him and all the facts collected. He found that little was known about the subject, and realized the greatness of his undertaking before he progressed far with his work. But he went at it in a systematic and scientific way, taking up its physical properties one by one. Causes of undesirable properties were ascertained and results improved. The following problems confronted him in the beginning:

First: Nature and cause of a movement of fillings caused by stress of mastication which he discovered and called "flow."

Second: Cause of expansion and shrinkage.

Third: Cause of weakness.

Fourth: Cause of change in properties with age.

Fifth: Composition of alloy having desirable properties.
Sixth: Manner of manipulation.
Seventh: Effect of varying proportions of mercury.

Proximo-occlusal fillings were noticed to give way under stress of mastication and protrude beyond the cavity margin toward the proximal. An instrument was built with which continuous pressure of a given weight could be applied by a spring. A dial was provided for recording any flattening which might occur in a cube of amalgam. Much careful work proved that tin was the ingredient causing flow, and that flow diminished as the percentage of tin decreased. A surplus of mercury also caused additional flow.

EXPANSION AND SHRINKAGE.

It was known that tin was the metal which caused shrinkage and silver that which caused expansion. Dr. Black proved that the amalgam shrank in proportion that tin increased and expanded in proportion as silver increased. Within certain limits, a filling material made of equal parts of silver and tin would shrink. He kept changing the formula by adding silver and subtracting an equal amount by weight of tin until the point was found where the expansion of silver in a formula just balanced the shrinkage of tin in that formula. This he termed "balancing an alloy." He had to build instruments for this work also. His micrometer measures shrinkage and expansion of fillings while crystallizing and for an indefinite time thereafter. A multitude of experiments were made.

STRENGTH AND WEAKNESS.

Strength was shown to depend upon the composition and age of alloy, amount of mercury and manner of manipulation. These will be dealt with at more length in paper on manipulation.

AGING.

To determine why an alloy which shrinks when fresh cut, shrinks more with age.

This was one of the most difficult problems of all to approach. It was pursued from different angles. He was handicapped by the generally-accepted opinion that oxidation or exposure to air caused such change. Pure oxygen was passed through fresh cut filings and no change was produced. The idea that shaking the bottle aged the alloy was exploded by attaching specimens to the drive shaft of a motor and violently agitating in the bottle for many hours without any effect. These experiments extended over many months. By a mere coincidence one specimen which remained near a stove for several winter months was compared with one of the same melt, same age, etc., which had been kept in an unheated room. That kept by the stove showed much more shrinkage than the other. The deduction led to the suspicion that heat produced this shrinkage. Further experiments proved conclusively that heat was the thing which aged or annealed the alloy. Thus another great light was set to burning.

Dr. Flagg told us that silver and tin were the principal ingredients in an alloy. Dr. Black found this to be true. Many experiments were made with various other metals as modifiers, seeking to increase strength and lessen flow. These metals were tried in varying proportions and each formula carefully tested. His conclusion was that copper as much as 5% was beneficial and that a small percentage of zinc in some ways was advantageous, and he recommended their use in his teachings at that time. When he wrote the text for his Operative Dentistry ten years later he said that zinc in any proportion was harmful and should not be used, copper being the only modifying metal deemed helpful to the alloy. The reason he changed his attitude regarding zinc was because the test fillings made in Wedelstaedt steel tubes were kept from the time of his earlier experiments and were measured every year. The fillings containing zinc, which behaved very well at first, were later found unsteady in the cavity, shrinking now and expanding then for the entire period of ten years. Shrinkage is the one property which renders an amalgam unfit for use because of the opening thus created around the filling. Shrinkage is equally harmful at any subsequent time as during crystallization the first ten minutes after insertion of filling. Thus zinc was determined by actual scientific experiments to be unfit for use as an ingredient of a dental alloy. With this finding another lamp was lighted to illuminate the path leading toward the goal. his deduction regarding manipulation and the use and effects of mercury, which will be dealt with in a later paper, completing his solution of the amalgam problem. The final lamps along the way were lighted and the dawn of a bright day was everywhere apparent.

The problems then remaining unsolved and to a considerable extent yet unsolved were:

First: Opening the eyes of the profession.

Second: Getting manufacturers to know and practice proper methods.

The profession as a whole accepted Dr. Black's work at the time it was reported and a large percentage of the profession followed his teaching in the main. In some particulars, however, the full benefit of his work has not been realized. In proof of this I would call your attention to a paper published in the February, 1918, number of *Items of interest,* written by Dr. T. P. Hinman, a man of much experience, who enjoys the high esteem of his profession. He is one of our leading educators and his opinion is readily accepted by a multitude of dentists everywhere as reliable and trustworthy, yet his teaching as found in above-mentioned article contains many grievous errors as viewed by one who accepts Black's teaching as truth. This case is cited to emphasize my claim that the rank and file of the profession has not yet opened its eyes and observed the light as revealed by the only really scientific investigation and report ever made on the amalgam question. My paper on manipulation of amalgam will deal with the same subjects and in the same order as Dr. Hinman's paper in the *Items.*

The manufacturer's part in the production of a good amalgam filling is just as important, if not more so, than that of the operator. It is impossible to do efficient and enduring amalgam work unless the manufacturer provides us with a good alloy. The problems confronting him in his work are:

First: Proper metals to be used.

Second: Balancing metals to eliminate shrinkage and expansion.

Third: Alloying, or bringing the metals together in uniform solution.

Fourth: Annealing, or aging.

Of the above subjects, one, two and four have been touched upon elsewhere in these papers. The problem of alloying the metals is one which requires especial knowledge as to process required and apparatus necessary, and more than ordinary correctness in details of technic.

By uniformity in the alloy, we mean that each grain of the finished product should contain the same percentage of each metal that was weighed into the crucible. This is not always easily accomplished. The heating should be done slowly. Electric heat is the best because it can be more uniformly applied, and more easily cut off at a uniform minimum degree. If overheated there is great danger of entechtic formations, in which event the proportions of metals are changed and the balance lost. When all the details of alloying are carefully watched and the work performed with due diligence and skill, there will be an occasional failure to acquire perfect results. This makes it necessary for the manufacturer not only to proportion his metals accurately by balancing but to test each melt before placing the alloy on the market, to ascertain whether his metals have come out of the crucible in uniformly the same proportions as they went into it.

SELECTING AN ALLOY.

The question almost always asked is, "What is the best alloy I can buy?" In answering this question there are several factors to be considered. One alloy may show more strength while another shows less movement in the cavity. One particular alloy may prove superior in a great number of tests, another bottle of the same brand may show defects, due to an oversight somewhere in its manufacture.

No one will go very far wrong, if he uses an alloy made by a well known and responsible manufacturer who claims to balance his formula according to Dr. Black's teaching, and who also claims to use only silver, tin and copper. The date of manufacture should appear on every package, so that we may be sure that the alloy has not become weak from age. Alloy should not be used after one year of age.

Soon after Dr. Black reported his work in 1895 and '96, several manufacturers sent a representative to his laboratory to take a course of instruction in alloy making. These concerns have been making good alloy since that time. When they get away from the idea that zinc is permissible, and make an alloy balanced with silver and tin with not more than 5% copper made into a uniform alloy, they will have reached the highest degree of perfection now attainable in alloy manufacture.

ALLOYS AND AMALGAM.*

BY D. A. ZURBRIGG, PH.C., D.D.S., MILFORD, DELAWARE.

(OF THE CAULK RESEARCH LABORATORIES)

TO INTELLIGENTLY DISCUSS and criticise a paper so general as the one given this afternoon, an advance copy for quiet study would have been an advantage. But since this was not possible, I have prepared a few notes and slides bearing on points suggested by the title of the paper, "History and Problems of Amalgam."

As stated by the essayist, Dr. McCauley, no paper on amalgam would be complete which did not quote largely from the works and writings of Dr. G. V. Black, for to him we owe the first real research work on the tooth-filling material to which you are devoting practically this whole meeting. That you are justified in so doing you have just heard from Dr. McCauley's paper, and no doubt in his paper tomorrow he will still further drive that fact home. But to consider Dr. Black's work as final, to look upon it as finished and complete, would be an admission Dr. Black would be the first to deny and discourage. So that if what I have to show and say in the few minutes at my disposal may criticise, may differ from, and even condemn what has heretofore passed current as proven fact, it is only because further work, with materials and appliances far superior to those procurable in Dr. Black's day, make this necessary.

The point I want to make is this—that methods and processes and physical apparatus of 1895 (20 years ago) are no longer tenable today since better ones are available. And it is to prevent your leaving this meeting with what I know are antiquated impressions of alloys and amalgam that I have travelled to Lexington. Now I have absolutely no right to make such a statement without abundant proof, and it is this evidence I now want to offer. It may interest you to know that this is the first public dental showing of all except three slides, these three in a somewhat modified form having been published in the *Dental Quarterly*, February, 1918.

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*An informal talk, illustrated with lantern slides, given at the meeting of the Kentucky State Dental Society, Lexington, Ky., June, 1918.

The first two or three slides (views of Caulk Research Laboratory) are shown because history is being made in the quarters pictured every day—but it is recent, modern history—not medieval. About four years ago some work under the direction of Dr. F. L. Grier (who was one of the three original pupils of Dr. Black 'way back in 1889), brought up a number of problems on alloys urgently needing solution. It was realized that an immense amount of good could be done if done thoroughly, and it is to the credit of the men who foot the bills that this building was erected—a building devoted exclusively to research and testing work on dental filling materials.

Equipment is, of course, of greatest importance, and this slide shows a general view of the Physical Laboratory. (*Fig. 1*—an interior view.) In the foreground is an *Interferometer* arranged to reveal the bending of a 3-inch steel shaft when pressed by the finger. To the right is a travelling microscope, of which more later. Behind is a *dynamometer* for measuring the force exerted by a dentist while filling a tooth. As far as I know this never has been accurately recorded. The problem is more complicated than it at first seems. A platform balance with movable table would not do at all. The moment pressure is exerted, one unconsciously "lets up," making a record quite false. What is needed is a base so rigid and solid that no movement, even under the hardest pressure, is perceptible to the hand. This is accomplished in this instrument by a series of pivoted optical mirrors whereby a beam of light is projected onto a moving photographic sensitive paper. This also carries a time record, so that we have a complete picture of the whole operation of filling a tooth as to time taken and the force exerted for every moment of the operation. Other apparatus

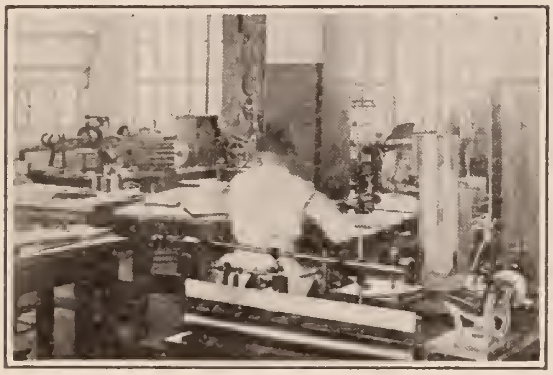

Fig. 1

Fig. 2

are a tensile testing machine, photomicrographic apparatus, drill press, grinding wheels, lathe, etc., necessary in every physical laboratory.

Fig. 2 shows the left observer measuring dimensional changes of an amalgam in the dilatometer. A record in one-minute periods of 3 to 8 hours are daily occurrences, 24 and 48-hour minute observations frequent and 7-day charts also have been made. This means that temperature and movement readings have been made for every minute (day and night) of that time. The right observer is controlling and determining the temperature of specimens undergoing crushing tests. In the rear appears an air analyzer for sorting powdered materials that are too fine to be sorted by sieves.

Metallurgical microscope — a necessity in every well-equipped physical laboratory — *microscope comparator* for measuring dimensional changes in amalgams at stated periods. The apparatus is here shown without its housing, controlling the temperature of the specimen. Obviously the temperature must be the same each time the specimen is tested, for as will be shown later, the temperature of the specimen on which tests are made has tremendous influences. By means of this instrument dimensional changes are noted and measured for any varying time-periods—days, months, or years apart.

Scleroscope for testing hardness of different materials.

Black Amalgam Micrometer with a collection of *Wedelstaedt tubes* — *travelling* or *screw microscope.* Both of these instruments are inmates of our museum, for both are unreliable, as well as not nearly sensitive enough. Black's dynamometer also belongs to this exhibit. The instrument is even less reliable than the micrometer, in fact is more an instrument with which to test your and my ability to put in a hard and dense filling, than a test of amalgam crushing strength. Please bear this in mind when the committee makes its report tomorrow.

This is the crushing machine which has displaced the Black dynamometer. It is arranged with electric heating for tests at any desired temperature, controlled and determined by thermo-elements used in conjunction with a potentiometer. The load is applied with regularity by means of the electric drive shown in the foreground. This machine *makes* the cylinders as well as *crushes* them. For accurate comparative tests, the alloy and mercury are mixed in definite quantities at a definite temperature, packed under a definite pressure, the load applied at a definite rate of speed, applied for a definite length of time, and the cylinder stored at a definite temperature for varying periods of time, and then crushed at definite temperatures. (*Fig. 3.*) The two cylinders on the left show a *plastic* or *large tin-content* alloy packed under a load of 400 Kg. per circular c.m., before and after crushing. It does not *break* but develops "faults," and then "mushes down," graphically showing what we dentists understand as "flow." The original pack was at 400 Kg. per cir. c.m. (7,220 lbs. per square inch), and it crushed at 2,000 Kg. (36,100 lbs. per square inch). The third cylinder, a high silver-content alloy, was packed at 1,131 Kg.; the fourth at 400 Kg., and the fifth at 141 Kg. Notice the uniform increase in height as the pressure is decreased in logarithmic progression. These three specimens are of a high silver alloy, and are made of like quantities of material (alloy-mercury). Cylinder No. 4 crushed is shown at the extreme right and failed at 3,125 Kg. (56,406 lbs. sq. in.) Note the clean breaks. No "flow."

The *Amalgam Dilatometer*, which has revolutionized amalgam investigations. This follows, as intimated in a previous slide, the

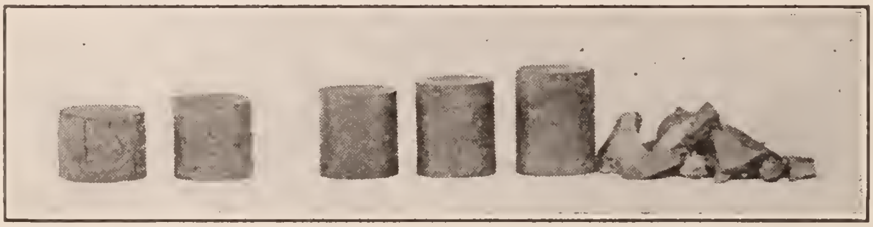

Fig. 3

minute to minute dimensional changes of an amalgam at any desired temperature. It is sensitive to 5/100 micron (0.05) or 1/500,000 inch. At the left is a special Wheatstone bridge used for precision determination of temperature with a platinum resistance thermometer. This temperature control is accurate to 1/10° Centigrade for any length of time during which observation may want to be taken. This is the instrument which has displaced Black's and later micrometers. In spite of its extreme sensitivity, it will accurately *repeat* any number of times,

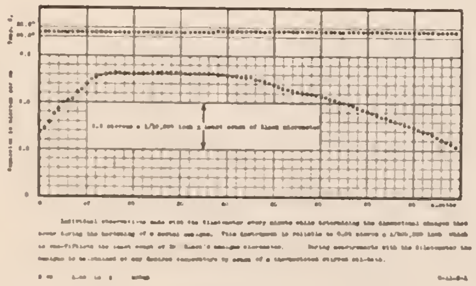

Fig. 4

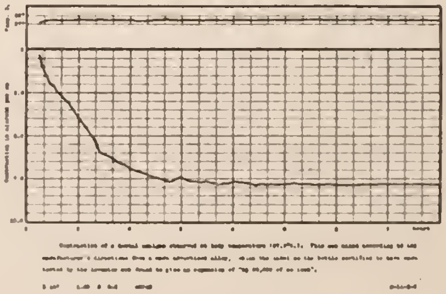

Fig. 5

something earlier apparatus never did. The practical significance of this is that with an inaccurate testing instrument an alloy may be given a clean bill of health one day, and the next day the instrument may condemn it. The instrument was off and not the alloy.

Fig. 4 is a comparison of the two instruments (Black's and this), compare the records given by the two instruments. Black's micrometer measurements take note only of comparatively large volume changes, these again seriously influenced by lack of temperature control. Here we have a *continuous* record. The upper dotted line is a record of the temperature, the lower shows *minute* to *minute* readings of a hardening alloy over a period of 1½ hours. Note that first there is a decided expansion, then a drop which is not yet complete. One point on the Black (about 1/32 to 1/16 inch) is represented on this chart by the blank space between the arrows. Remember also that the Black micrometer is not reliable to 1 point of itself (1 part in 3,000—the cylinder is 3/10″x⅜″ and on Black's micrometer 1/10,000″=1 point), and you have a mental picture why this instrument is now in our museum, an object of respect and veneration for past uses and a memento of its originator.

Fig. 5.—Just two more slides to show what a maker may honestly believe to be true and what actually happens. He is using what up to now has passed as a perfectly reliable instrument. He tests his alloy at room temperature (this varies from day to day), when he ought to use body temperature. Instead of *expanding* it actually *contracts,* this volume change being complete in about three hours.

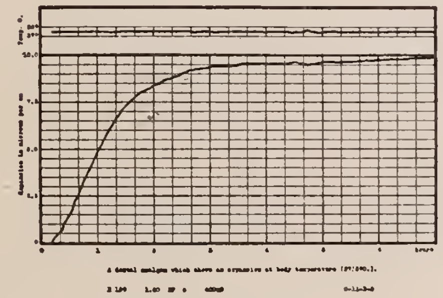

Fig. 6

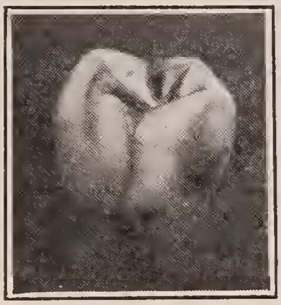

Fig. 7

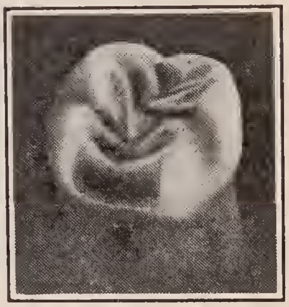

Fig. 8

Fig. 6 shows that an amalgam *can* be made to show expansion. The upper line shows how a temperature of 37.5° has been maintained. In this case also expansion or volume change is complete in about three hours. The amount of expansion, almost 10 microns (or 4 points on Black's micrometer), is not at all excessive, for we must remember that dentin has resiliency of from 1 to 5%, depending on the freshness of the specimen and the variation between specimens themselves.

We are all agreed on what constitutes a good alloy. Now let us see what can be done by an amalgam made from it. (*Figs. 7 and 8.*) Proper cavity preparation, properly contoured, properly carved and finished. Note particularly the bucco-lingual ridge, a landmark quite as important as the contact point. For even should the contact point be not quite restored, in a very short time the minute space will naturally close. Failure to restore the ridge, however, will permanently provide a "V" groove into which solid foods are constantly forced during mastication, with results all of us know only too well.

Fig. 9 is an illustration of good and bad dentistry. "A" is a filling only recently put in and vividly shows bad cavity preparation,

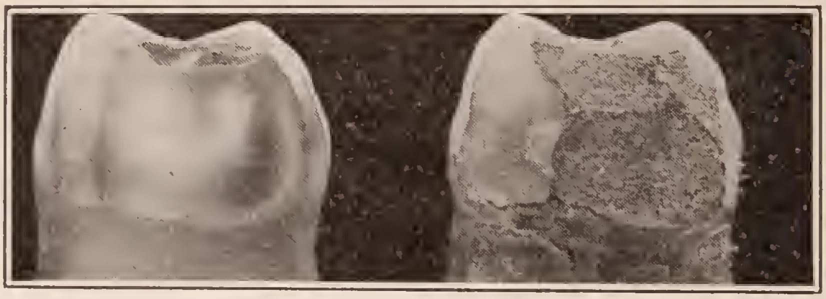

Fig. 9-B Fig. 9-A

a bad gingival margin, no contour, no final finishing. "B" shows the same tooth, with a restoration as it should have been.

Fig. 10 shows that such results are possible in the mouth. How can we make such fillings? Briefly stated, this is the procedure:

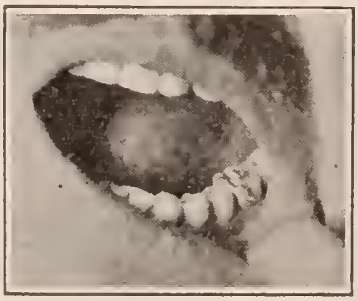

Fig. 10

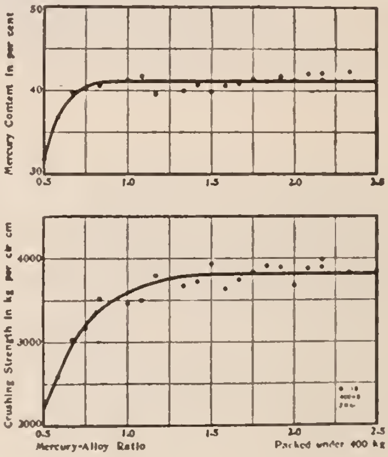

Fig. 11

1. *Use plenty of mercury*—certainly 10-16 (alloy-mercury), or more if you wish.

2. *Triturate in a mortar three to four minutes.*

3. *Pack as hard as you can* with as small pluggers as are practical.

Fig. 11. A moment ago I said that you were to use plenty of mercury, and, except for economy's sake, that you were even to forget all about weighing them. Certainly use not less than 10 of alloy to 16 of mercury. There is only one proviso, and that is *get rid of as much mercury* (after amalgamation) *as possible*, either before inserting the amalgam into the cavity or during the packing. Plenty of mercury makes amalgamation easier, more quickly, more thorough, and being more thorough and complete, makes the final amalgam the very strongest possible.

With a packing pressure of 400 Kg. per cir. c.m. (approximating the average pressure used by a dentist using a plugger face of 1 cir. c.m.), we find that at the old proportions of 5 to 7, the full strength of the amalgam has hardly been reached, that we must go beyond even 10 to 15; in fact, 10 alloy to 16 mercury is the least mercury amount we should use for greatest strength, larger additions of mercury giving no further increase. The upper part of the chart shows the amount of mercury remaining in the cylinders at these different A-M ratios. Remember that hard packing always is urged, for, under the same packing pressure, the final mercury content is always the same, no matter how much was used in the first instance.

As noted before, the 400 Kg. packing pressure of this chart corresponds to an average high packing pressure as used by us in every-day chair work. I might add that this means a *burnishing* pressure, *not malleted.* Malleting does not produce as dense a filling as burnishing, and smooth pluggers are for this reason more effective than serrated ones.

So these are the reasons and the evidence upon which we advise the use of plenty of mercury, *but* get rid of it in one of the ways above mentioned. If you express all the mercury at once, you will have a quick-setting amalgam.

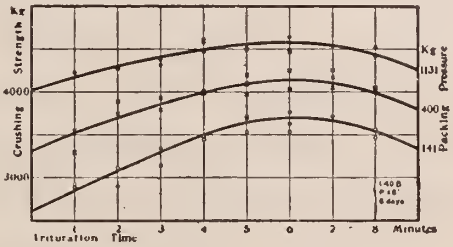

Fig. 12

As to manner of amalgamation, a mortar and pestle is the best method. This chart (*Fig. 12*) shows the influence of different triturating time (from 1 to 8 minutes), on the crushing strength of the amalgam at the three different packing pressures after eight days. Triturating only one minute at 141 Kg. (low or indifferent pressure), gives us only 2,800 Kg. crushing strength; after two minutes' trituration this has risen to 300 Kg. and after four minutes' trituration, the crushing strength has reached 3,500 Kg. With heavier packing, the gain is not quite so rapid, though equally important. The heaviest packing pressure (1,131 Kg.) shows exactly the same tendency. These figures hold for ordinary temperatures. For all three packing pressures, increasing the trituration time to six minutes *also increases the ultimate crushing strength,* but the gain is so slight that we may safely disregard it for all practical purposes.

There are many other phases which lack of time will not allow us to go into, noticeably volume changes. (*Figs. 4, 5 and 6.*) These initial volume changes (entirely missed by Dr. Black), inherent to every alloy now on the market, can be almost entirely eliminated by, *first,* a properly-formulated alloy; and *second,* proper manipulation. It is understood of course that your alloy has been properly annealed, for such alloy never changes and therefore requires no date. To date an alloy is making a virtue of a fault. It is an admission of insufficient alloy-making knowledge.

May I, then, again summarize the procedure for getting most out of your alloy by what seems to me amply proven precise physical laboratory investigations?

First: Use not less than 16 parts mercury to 10 of alloy (8 to 5). More mercury will do no harm, but will not improve it, either. It *will,* however, make amalgamation easier.

Second: Triturate 3 to 4 minutes in a mortar with hard, vigorous pressure.

Third: Pack as hard as possible with as small pluggers as will do the work, that your final filling will be as low in mercury-content and therefore as dense as possible, and then carve for full functional restoration.

MANIPULATION OF AMALGAM AND ITS USES.*

BY C. M. MCCAULEY, D.D.S., DALLAS, TEXAS.

THE TENDENCY of modern times in business pursuits as well as the professions is towards higher efficiency in all kinds of service. One writer has said that every man should regard his calling as his ministry to the race. Thus every man who has a calling should regard first the use of that calling in the service of his fellow man. The dental profession at this moment, more than ever before, owes its clientele a debt of gratitude which can be paid only by service and efficiency. The purpose of this paper, therefore, is not to seek out the shortest route to a given end, but to work toward the goal of highest efficiency in a noble service.

In studying manipulation of amalgam, therefore, let us not seek the short cut which may enable us to do more work of a passable grade in a given time, but let us seek to reach the highest possible degree of perfection in each operation. Observe details closely. Just as conditions in each and every oral cavity are different, so the environment of each and every amalgam filling is different. Each amalgam operation should be considered a case in itself.

Before beginning the amalgam operation a mental picture of details separately and collectively should be drawn, such for example as follows:

First: Location of cavity. Pit or fissure—occlusal cavities. Location of cavity outline which will admit of finish without interference of deep grooves. Smooth surface, such as proximal cavities. Location of proximal and gingival cavity margins, well into immune area.

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*One of a symposium of essays on Amalgam read before the Kentucky State Dental Society, 1918.

Second: Dryness.

Third: Preparation of cavity. Flat seat—parallel walls—retention form—margins beveled—caries removed.

Fourth: Adjustment of matrix, to produce tooth contour in filling.

Fifth: Separation, by most effective and least painful method available for the case in hand.

Sixth: Mixing amalgam. Correct proportions of mercury and alloy. Mix in mortar—knead in palm to get proper mix—expressing mercury if indicated.

Seventh: Selection of suitable instruments.

Eighth: Packing amalgam into cavity. Proper consistency for packing, so as to be able to cover all walls and margins, building well over margins.

Ninth: Carving of occlusal surface to reproduce physiological function of cusps and grooves.

Tenth: Finishing.

Some of the above details are applicable in all cases, while others are never the same in any two cases.

COMPOSITION.

In the composition of amalgam alloy no zinc should be used. Tin and silver so balanced as to eliminate expansion and shrinkage make a good alloy. Five per cent. of the silver may be removed and an equal amount of copper added. This results in a stronger amalgam. The best alloy possible to be made in the light of our present knowledge is composed of tin, silver and copper.

MERCURY FOR USE WITH AMALGAM ALLOY.

Mercury is the solvent into which the alloy is brought for uniting the particles into one mass. Mercury used for this purpose should be free from impurities. That refined from the ore and usually sold by the manufacturing chemist is safer than that sold by any concern which buys old metals for purification. Impurities in mercury usually can be seen in the form of a dark coating over the surface which gives it a dull appearance. It fails to form perfect globules and if shaken in a clear glass bottle it forms a coating over surface of the bottle. This contamination is usually lead, tin, zinc or bismuth and may be removed by agitating with strong sulphuric acid. That sold by druggists is more reliable than that sold by the dental manufacturer who secures any part of his mercury from old amalgam fillings.

The two factors which determine percentage of mercury required are:

First: Composition of alloy.

Second: Degree of annealing.

The more silver in the alloy the more mercury required. Modifying metals also have some influence. In all high-grade alloys the percentage of silver is practically the same, and the percentage of modifying metals very small. Consequently the degree of annealing makes the principal difference in the amount of mercury required. A balanced silver: tin and copper, annealed to zero—that is, boiled in water fifteen minutes or its equivalent of heat—will require about 55% mercury. This alloy is quick-setting and possesses the greatest possible strength. The same alloy boiled twenty minutes will require only about 50% mercury, and is slower in setting and not so strong. The same boiled still longer requires less mercury, sets more slowly and is still weaker. The alloy should be weighed and placed in capsules, about fifteen grains in each. Mercury should be measured in a mercury meter and placed in capsules, or both alloy and mercury may be weighed in balances designed for the purpose. If the percentages of each are not given by the manufacturer, same should be determined by test.

CORRECT PERIODS FOR MIXING.

Pestle and mortar should be provided. End of pestle should be large, and its convexity should fit the concavity of the mortar. If glass, the surface should be ground. Wedgewood is perhaps preferable. About one minute in the mortar and two to three minutes in the palm will make a suitable mix for a filling, when a high-grade alloy is used and the usual amount for filling a steel tube, about 13 grains. The purpose of the mortar is merely to unite the ingredients; the palm to accomplish solution. The time varies, however, as rate of setting varies. The mass, when compressed between the fingers, should show the skin marking clearly, and should be sufficiently rigid not to flatten any when laid on the table. If any excess mercury is present at this stage, it should be squeezed between the fingers and removed. It is practically impossible to adapt the amalgam to cavity walls and margins unless excess of mercury is avoided at all stages of the operation. The tendency of a thin mix to follow the plugger when drawn away from cavity or margin absolutely condemns the practice of leaving enough mercury in the mix even to approach a sloppy mass.

The amalgam should be divided into several parts and placed in a convenient place for the operation. All details of cavity, matrix and dry field having been attended to, a piece of amalgam nearly as large as the floor of the cavity should be introduced and with a large serrated plugger pressed firmly into the base of cavity with heavy hand pressure, shaking the plugger as the pressure is applied. Let every stroke of the plugger count. Do not pat the filling. The fewer strokes of the plugger the better the filling, because extra strokes bring mercury to the surface and chop up the mass unnecessarily. The pressure should be from the center of the cavity toward the surrounding walls. When the cavity is full, add more amalgam and condense it directly over the margins. If properly proportioned with mercury and manipulated right, mercury is not likely to work to the surface. If it does, however, remove it with instruments and add more amalgam.

Amalgam has no adhesive properties, whether worked sloppy or dry. Subsequent discoloration, therefore, is not due to lack of adhesion on account of working dry. Discoloration is caused generally by entrance around the filling of sulphuretted hydrogen, which forms sulphuret of silver or sulphid of copper, when it comes into contact with the filling. To prevent discoloration use amalgam which does not shrink.

USE OF MATRIX.

No proximal cavity can be filled with amalgam without the use of a matrix. Sheet steel or copper about three hundredths of an inch thick makes the best matrix. Copper generally is preferable because it will admit of better contouring. Matrix should be cut and fitted to the case in hand, contoured to restore tooth form, ligated firmly to the tooth in such a manner as to have approximal and gingival margins closely and snugly overlapped. It usually is necessary to place a wedge at gingival to hold matrix close against tooth at cavity margin. This wedge should enter from the lingual aspect on account of the widening of the embrasure toward the lingual. No matrix should be used which will interfere with adjustment of a separator in cases where indicated.

CARVING.

When the filling which has been placed, over-filling the cavity, has crystallized sufficiently to permit cutting without distorting its shape in any degree, the carving may begin. Sharp instruments, such as the Frahm set and the Wedelstaedt carver, may be used. Shave away the excess which is built up over the occlusal margins, cutting to the remaining occlusal tooth structure or to the normal contour. Carefully shave the amalgam down flush with the margins, then shape the occlusal surface, restoring contour of lobes, marginal ridges and grooves. Ascertain before placing the filling about what the depth of grooves should be to accommodate cusps of opposing teeth. A companion tooth in the same mouth will act as a guide in general contour and shape.

Never use a burnisher in finishing an amalgam filling. The pleasing effect produced by the burnisher is perfect camouflage. The real effect of its use is positive detriment to the margins over which it is passed.

WASHING AMALGAM.

Washing amalgam has been advocated, but there seems to be no good reason for it and it is certain that there are good reasons for not doing it. such as loss of time and interfering with crystallization. Objections have been urged against manipulation in the palm. The bases for such objections are not sufficiently well founded to overcome the advantages gained in strength of the filling and working properties where palm manipulation is used.

CARE OF ALLOY.

The bottle should be kept closed merely to keep out dust and other foreign particles. Exposure to the air makes no difference whatever as to aging. It is heat only which produces further annealing and consequent weakening of the alloy. To prevent alloy from annealing to the point of making the amalgam weak, do not use it after it becomes old. The date of manufacture should appear on every package of first-class alloy and none should be used longer than one year after that date.

My experiments with amalgam have been made with the micrometer which measures expansion and shrinkage, the dynamometer which measures strength and flow, and the binocular microscope which checks the micrometer in its verdict. I never have used the air-pressure tests. It makes less difference whether air can be forced around a filling from underneath than it does whether moisture can creep in around the filling from without. If the micrometer shows shrinkage and the microscope confirms it, we may be sure that moisture and micro-organisms will enter around the filling and that discoloration and caries will result. Avoid shrinking amalgams. Get away from those containing zinc, for they shrink and expand alternately as long as time shall last. In a great many fillings made six years ago and still in my tubes, the only ones wihch did not change volume in that time were those containing no zinc.

The claim that the proportion of metals is altered by expressing more tin when the mercury is expressed, is not well founded. Expansion and shrinkage are unchanged by the squeezing out of mercury; it therefore must be true that no perceptible change was made in the proportions of tin and silver.

FINISHING.

The filling should be contoured and carved while crystallizing but the polish should not be applied until the following day or even later. Proximal surfaces should be polished with disks and strips. Occlusal surfaces with wet emery dust on stiff bristle wheel, followed by pumice. Sometimes disks and finishing burs may be used on occlusal surface without disturbing the contour.

SEPARATION.

The importance of separation of teeth for proximal cavities cannot be too strongly emphasized. No person who fails to do this is entitled to the reputation of being a conscientious and painstaking operator. He will fail to reproduce normal contact, and in so doing, his work will ultimately produce more evil than good.

USES IN OPERATIVE DENTISTRY.

Amalgam is limited in its use to the bicuspids and molars as a filling material. For these teeth it holds first place, both as to extent of use and tooth-saving properties. When I place it ahead of the gold inlay many will take issue with me, but so far as clinical evidence and the principles of physics and teachings of modern dental hygiene are concerned, my contention will be amply supported.

I want to emphasize especially the value of amalgam for restoring crowns of molars, in whole or in part. The use of shell crowns should be discontinued in every case possible. The record made by gold crowns in producing unsanitary conditions, irritation of gums and pyorrhea is quite sufficient to place it in disrepute with men who seriously strive to render the very best service to their patients. By use of posts, cemented in the root for anchorage, and a copper band fitted about the gingivus, contoured to tooth shape and filled with amalgam, after which the occlusal surface is carved to restore occlusion, we accomplish a result which, from standpoints of sanitation, prophylaxis, beauty and utility, far exceeds the average gold shell crown, and is more sanitary and durable than any restoration held in place by any soluble plastic.

AMALGAM VERSUS GOLD INLAY.*

BY W. W. TAYLOR, D.D.S., LEXINGTON, KENTUCKY.

IN REPRESENTING the inlay side of the question in a symposium of this kind, viz.: Inlays vs. Amalgam, I am not unmindful of the vast field of usefulness and the inherent possibilities of alloys as a filing material, for, with the advent of this most common of all dental operations, by which means countless numbers of teeth have been restored to their former state of usefulness, thereby adding years of comfort, service and health to their possessors, dentistry made a tremendous stride towards its present high plane as a department of the healing art. Alloys have for years, and still will for years to come, I venture to predict, remain the standby for the busy practitioner. The saving of time incurred, and its ease of manipulation, even in the hands of the most unskilled appeal to many, and this reason alone—that human tendency towards the way of least resistance—leads many to its use, where better and more esthetic operations are clearly indicated. There is daily a growing demand among our patients for a better class of dentistry, the propaganda of oral hygiene that has swept over the country in the last few years is having its effect in the education of the public, and the man who refuses to heed this demand or fails to adapt himself to improved conditions, is hopelessly doomed to the ranks of mediocrity. The public, let me repeat, is demanding skilled service, and it is our duty as professional men to furnish that skill—skill not only as to technic, but as to the selection of materials as well.

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*One of a symposium of essays on Amalgam read before the Kentucky State Dental Society, 1918.

While, from the standpoint of the patient, for financial reasons, it is many times impossible, yet with his knowledge of existing conditions in each individual case, the responsibility of the choice of the filling to be used should rest with the dentist alone. The tendency in the past has been, by reason of its cheapness and ease of insertion, toward the indiscriminate use of alloy fillings, where a slight effort by the operator towards the education of the patient would have resulted in restorations by means of inlays, that for beauty, occlusion and permanence are vastly their superior.

The primary object of dentistry is to maintain the organs of mastication as nearly as nature intended they should be as is possible, and the means or the materials by which this can best be done are the ones most clearly to be chosen.

It is a well known fact that recurrent decay is brought about by acid-laden secretions being allowed to creep in between the filling and the cavity wall, and this space is either the result of faulty insertion. by which microscopic joints are left, or else by reason of the failure of the material in use to stand up under the crushing strain of mastication. No filling, no matter how skillfully inserted, how carefully finished, or how esthetic in appearance, if exposed to the stress of the human jaw, can hope for any great degree of permanence, unless it possesses certain inherent qualities of edge strength, or freedom from flow under pressure, and while in the majority of modern high-grade balanced alloys, the latter weakness has been overcome. the former has never yet been attained. Those of you who have taken occasion to observe the appearance of those fillings that have done service on the exposed occlusal surfaces of bicuspids and molars, could not but note their one fatal weakness was this so-called edge strength.

The fracture of the metal at this vulnerable point invites the incursions of food, and the results usually are swift and sure. Gold, by reason of its many desirable qualifications. has from the earliest history of dentistry to the present time, been used as a means of preserving the teeth, and with the discovery, scarcely more than a decade ago, of the means by which a cast could be made from a wax impression, dentistry made what is unquestionably conceded to be its greatest advance.

When a material combines the possibilities of a perfect restoration as to contour and occlusion, with the ability to hermetically seal the cavity from invasions of oral secretions, the step towards the ideal filling is certainly one in the right direction. One of the crying needs of dentistry today is attention in detail to occlusion and contour. It is an established fact that one of the great contributing causes of pyorrhea alveolaris is trauma, brought about by poorly-articulated fillings, or the packing of food into the interproximal spaces, the result of faulty contour, and in this respect how grievously has the amalgam filling sinned and been sinned against.

This one fact alone—the difficulty of carving to perfect occlusion with the opposing teeth—is sufficient to condemn its use, where occlusion is paramount. With the advent of the inlay, this difficulty is overcome, for with a degree of care and skill, restorations can be made that for comfort, permanence and real service rival nature's own.

Within the limited time allotted me, it is impossible to go into the constructive detail or point out the many possibilities of this class of work, for they are legion, and limited only by the skill and originality of the individual undertaking it. It is my idea only to emphasize a few of its many advantages and to make a plea for better, more skillful, painstaking dentistry—a dentistry that gives our patients a hundred per cent. service, and a dentistry that with our help eventually will take its place on the high plane it so justly deserves.

CAST GOLD INLAY.*

BY M. H. DAILEY, D.D.S., PARIS, KENTUCKY.

YOUR EXECUTIVE COMMITTEE is a most patriotic one; they did not hesitate to use conscription in filling out the program for this meeting, and in one instance at least they made a mistake—used bad judgment.

If we could go back to those good old days when, as a boy, in the hills of eastern Kentucky with a rifle in hand, a squirrel in the top of the tallest hickory tree was easy picking, we would not wait to be conscripted; we would be right over there in the trenches getting our quota of Huns along with the rest of the boys. And we feel sure that our efficiency under those circumstances would be more effective than trying to present to you upon this occasion the subject of the Cast Gold Inlay.

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*Read before the Kentucky State Dental Society, 1918.

It is well that your committee requested a *short* talk on this subject they have assigned to us and they have assured us that all they expect us to do is to say something to start a discussion.

Under the circumstances, we shall not attempt to treat the cast gold inlay under any particular phase; our object will be simply to touch upon the subject, emphasizing here and there points that may lead to a helpful discussion by members of our profession who are so thoroughly acquainted with it; who, we might say, are masters of the technic of constructing the inlay. We shall expect them to tell of their favorite casting machine; what brand of wax they prefer; whose investment material they are using, etc.

The cast gold inlay came to the dental profession like an earthquake or a bolt out of a clear sky; indeed, it was a wonderful discovery. It swept over the country like a mighty wind and brought glad tidings to us all. Besides being a welcome announcement, the process is one of the most valuable achievements that ever came to the profession, and as a profession we quickly realized its possibilities and at once sought to avail ourselves of the benefits that have surely been ours to enjoy.

Most all the members of the profession immediately were like busy bees, inventing casting machines. All kinds, sizes, shapes and forms were soon on the market, and many of us were fast getting rid of our hard-earned cash trying to get the most efficient one.

If we compare the gold inlay with other filling material, unquestionably we must put it among the best (if not the best), especially under those conditions where our honest judgment prompts us to use it.

We believe it is possible to show greater skill, to more perfectly carve, contour and shape a gold inlay, to restore a badly broken-down molar and bicuspid, to combine strength and at the same time secure results that are pleasing to our patients with the inlay than with amalgam or any of the many filling materials in use today.

There are many things to consider when we are contemplating the use of any filling material: the patient's financial condition, what material will best preserve the tooth, what kind of filling will be easiest and at the same time most beneficial to the patient. If we are really honest, and if our experience really has taught us when and where to use the various filling materials, whether it be amalgam, malleted gold or the cast gold inlay, when properly chosen and installed each filling always will stand in our patient's mouth as a monument to our wisdom, honesty and skill.

The cast gold inlay should be used only when the operator's judgment prompts him that there can be placed in the cavity no other filling material that will do so much to preserve and save the tooth. We fear that the financial gain or difference in price may sometimes tempt us to use an inlay when the amalgam fillings that were perfectly satisfactory were taken out and replaced with gold inlays of an inferior character. That is, we believe, the worst kind of robbery. We see gold inlays placed in cavities where it was necessary to cut away and sacrifice much tooth structure. That is double robbery, getting the money and also the tooth.

The gold inlay is, we believe, more indicated in restoring decayed molars and bicuspids unless the cavities are small gingival or pit cavities, and in approximal cavities in molars and bicuspids where it would be a long, difficult, trying, tedious operation both for dentist and patient to fill with gold foil and when amalgam would be a hideous sight; in such cases, surely the gold inlay is indicated. One of the good points in filling such cavities with gold inlays is carving the wax and getting a perfect point of contact. The possibilities of the gold inlay cannot be fully fathomed as yet, for each year its field of influence and usefulness widens; in the hands of the skilled operator we find restoration of cavities more substantial and very much more esthetic.

Then there are other cavities where the cast gold inlay may be used to better advantage than any other filling material; in lingual and buccal cavities where rubber dam, dental floss and clamps are most objectionable; also the distal surface of cuspids and in large approximal cavities of the incisors.

We find many times large approximal cavities involving the cutting edge which prohibit, I might say, synthetic porcelain, and where the time and nervous strain both on patient and operator in using gold foil would seem to us to be more than ridiculous now that the gold inlay has come to light. In cases of this kind it is just what we want; it saves the incisor and assures edge strength above any other kind of material. Therefore, is it possible to use any other kind of filling in as many different ways and be rewarded with results of such satisfaction and efficiency, as in the case of the cast gold inlay? Let us consider bridge work, with the gold crowns blinking and winking like lightning bugs. In many instances these can be made just as strong and infinitely more sightly by the use of the cast gold inlay.

It is quite true that we are having failures with the inlay, as well as success. Some men can get better results than others, but the same thing is true of gold foil. Where one may succeed with the one, another may succeed better with the other. However, we believe there are more dentists that fail with gold foil than with the cast gold inlay. The inlay is necessarily a laboratory product, a reproduction of a wax model, and gives a careless operator a better chance to get by with a filling that will be serviceable. The life of all fillings depends upon correct cavity preparation and we would emphasize the importance of such preparation for a cast gold inlay if it be expected to give good and lasting service. Every step in the process of making the cast gold inlay, from the cavity preparation to the finishing and setting in of the filling, must be carefully and correctly handled.

We feel sure that each and every dentist has worked out his own individual plan and technic that suits his own method of constructing the inlays and we hope to hear some interesting points brought out by the gentlemen who are especially interested in this branch of the work.

SERIAL EXTRACTION IN PYORRHEA.

BY W. CLYDE DAVIS, M.D., D.D.S., LINCOLN, NEBRASKA.

FOR SOME MONTHS I have been using serial extractions, in mouths where pyorrhea was general, in the treatment of systemic lesions. The results have been very marked.

I think they are more than equal to the injection of a specially-prepared autogenous vaccine. To go over the entire subject it would be necessary to write a fairly good-sized treatise on micro-organisms in the mouth. I therefore ask my readers to refresh their memories on forms of bacteria usually found in these oral infections. Also study the theories of the conditions of altered re-activity on the part of the body which comes about as a result of infection and designated by the term Allergy; review the theories of immunity; also the development, source and disposition of anti-bodies.

Again go over the process of the development of anaphylaxis. Make a short review of vaccines and their uses. Also the methods of producing autogenous vaccines and their particular use in combating the general lesions which the parent bacteria have produced.

We are now ready to intelligently undertake the treatment I will here outline. With each individual case a record similar to the one which follows should be kept:

Name.. Age....................
Residence ....
Date of First Consultation...
Systemic Disorder ....
Temperature.................. Blood Pressure.................. Pulse Rate..................
Radiograms ....
....
Advice ....
....
....
....

CLINICAL HISTORY.

Date.................................. Operation.....................................
Blood Pressure.................. Temperature.................. Pulse Rate..................
Remarks ....
Date.................................. Operation.....................................
Blood Pressure.................. Temperature.................. Pulse Rate..................
Remarks ....
Date.................................. Operation.....................................
Blood Pressure.................. Temperature.................. Pulse Rate..................
Remarks ....

For convenience we will take a case where most of the teeth are in the mouth, some of the teeth are loose from pyorrhea, and those which are not loose have been filled and the X-ray shows abscessed conditions in the apical region. General extraction is decided on in this case.

The first sitting we extract one, two or three of the teeth. Six or seven hours thereafter there probably will be a febrile reaction showing a rise of temperature from one to three degrees. This generally subsides within a few hours.

From your previous review in bacteriology you will see the reason why the next sitting should be from eight to twelve days after the first. I generally make an appointment for the eighth day. If the general trouble from which the patient is suffering is worse at this time I postpone the operation for two or three days.

I continue the extractions in these periods of about eight days to completion of the case.

Each time I open the tissues in extracting I infect my patient, which has the same result as the injection of an autogenous vaccine. During the process of extraction I try to avoid and not operate on the twenty-first day from the first operation. You will get the reason in the study of theories pertaining to anaphylaxis.

By this method my surgical work acts as a treatment with benefit to the general lesion present. In case there is a general weakness due to oral infection, but the same has not manifested itself, I am giving such patients just the treatment they should have with a view to the checking of further development of their latent organic trouble.

I have dozens of cases, both private and in my clinic, wherein cures have been most prompt and marked.

I will cite just one case and leave the methods with the profession for a trial:

Mr. H., sixty-six years old, blood pressure 210, temperature two degrees above normal, a flow of pus from around every one of the twenty-six teeth, most of them loose.

First sitting in April, extracted three teeth. His daughter is a nurse and reported two additional degrees of temperature six and one-half hours after operation. Eight days later blood pressure 200, two degrees temperature, extracted four teeth. Seven hours later the reaction showing only one additional degree of temperature. Eight days later extracted six teeth, blood pressure 175 and no temperature, no reaction. Eight davs later blood pressure 160, no temperature; extracted remainder of teeth, slight reaction that night.

His blood pressure has been taken once a week now for four months and the temperature is generally normal and I have not found his blood pressure above 160 on any occasion.

I have secured similar results in rheumatism, neuritis and many organic troubles.

I assure my brother physicians and dentists that the method is worth a trial.

In the treatment of pyorrhea a similar general effect is produced if two or three teeth are curetted at each sitting with about eight days between sittings. At each visit thoroughly curette the alveolar borders, opening the blood stream to a small amount of additional infection to act as a vaccine.

SOME VITAL PHASES OF FRACTURES OF THE JAWS.*

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THE SUBJECT OF FRACTURES of the jaws is one that has attracted the attention of medicine since the days of Hippocrates. It also is a subject that was of considerable interest to dentistry long before it became a profession. Indeed, many of the principles laid down by Hippocrates can be used today with a moderate degree of success. It was Hippocrates who first originated interdental ligation. It was also Hippocrates who condemned the use of bandages alone as a procedure in the treatment of fractures of the jaws.

In presenting the subject of fractures of the jaws at this time, we shall touch on only two or three vital phases of the subject. The first phase which we shall attempt to discuss will be the process of repair. We use the word "discuss" advisedly, because in our present state of knowledge of the subject, we can only discuss it. We are not in a position to make any dogmatic statements.

Just what takes place in the behavior of the tissues in the process of repair of bone is a question offering a diversity of opinion. There seems to be an antagonistic state of opinion about the theory of bone growth. There are two schools that are contending for the maintenance of their theories along this line: One contends that the periosteum is a limiting membrane without the property of osteogenesis; the other maintains that the periosteum is an ostegenetic membrane, and can go on functionating, developing and nourishing new bone.

Havers, in 1692, gave the first accurate account of osseous structure and described the periosteum as simply a connective tissue, limiting and vascularizing membrane.

Antoine de Heyde, in 1684, made some observations on frogs and determined that callus was formed by calcification of a blood clot extravasated around broken bone ends.

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*Read in the Section on Stomatology (A. M. A.), of which THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement.

In the middle of the eighteenth century, Duharnel brought out the generally-accepted theory of the function of the periosteum. His view was that the periosteum became thickened and succulent around a fracture and by pushing the new tissue in among the fragments it formed a callus. In his experiments, he discovered a layer of cells lying next to the bone. To this layer, he gave the name cambium layer. This layer of cells between the true periosteum and the bone is recognized in the bone work now being done in Europe.

Macewen[1] is emphatic in the statements that the function of the periosteum is simply a limiting membrane and does not have the property of osteogenesis. He made many experiments on dogs. In these he seems to prove that the periosteum does not produce new bone. In many instances, he reports that the whole radius was removed, leaving the periosteum. He finds in these cases that after several weeks no new bone is formed. In his experiments, he finds no place where the periosteal flaps produced new bone. He also finds that where the periosteum was not intact, there was a marked hypertrophy of the bone, showing that periosteum limits bone growth.

These experiments of Macewen are substantiated by similar experiments by Cohn and Mann. Their experiments included transplanting of bone denuded of periosteum into muscle, into the medullary canal and into newly-made bone defects. Some of these transplants were covered with periosteum and others were not. It was found that isolated bone grafts did not act as foreign bodies and were not absorbed after sixty days, but showed a tendency to outgrowth. They also made experiments in which the periosteum *per se* was transplanted around the carotid artery. This did not show bone proliferation. They came to the conclusion that the periosteum was not at all essential to the healing of a fracture.

Other investigators in this country have made similar experiments with similar results. These investigations, with others, represent the work of the contenders of the theory that the periosteum is simply a limiting membrane. The other class of investigators in bone work contend that these experiments must have been carried out with simply the outer layer of the periosteum, which is a limiting membrane, and that the inner layer, or the cambium layer, the layer which Hey Groves terms the epiostial layer, or the osteogenetic layer of the periosteum, was not considered.

Our experiments at the University of Michigan hospitals do not accord with the theory of Macewen. We have found that periosteum transplanted into the muscle tissue will produce new bone. This new growth seems to have all the properties of true bone; its blood supply, its bone cells and the process of true osteogenesis seems to be normal.

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[1] Macewen, Sir William: The Growth of Bone, New York, The Macmillan Company, 1912.

This deposition of bone differs from other calcific deposits which may take place in the body, such as in the spleen, liver, kidney, etc., under certain pathologic conditions, so that we feel quite positive that under suitable conditions, true bone may form from the periosteum.

Hey Groves summarizes as follows:

"The periosteum is chiefly a limiting membrane of the bone. The dense bone can live, grow, undergo repair, and produce fresh periosteum after the latter has been removed. In young bones it is possible to remove the periosteum in such a way as to produce an osteogenetic membrane, this being probably due to the lifting up of the epiosteum with the periosteum. In adult bones this is impossible except after trauma or an inflammation."

In the repair of fractures of the jaws, we feel that the retention of the periosteum is highly desirable, because its removal takes away much of the epiosteum, and, also, because it affords a ready means of vascularization.

While there is a wide diversity of opinion regarding the function of the periosteum in bone repair, all investigators seem to agree as to the function of the compact and cancellous bone in the process of repair.

Ollier proved that quite apart from the periosteum and the marrow, compact bone could live and produce new bone and undergo the callus repair of fracture. The deep surfaces of bone, like the superficial surfaces, are capable of osteogenesis under suitable stimulus.

Axhausen has shown that the wide haversian canals contain active osteoblasts and favorable conditions for new bone formation. It has been observed in gunshot fractures in France that when the ends of the fragments have been exposed and laid bare, by stimulating the ends by a drill, in a short time buttons of granulation tissue would be pushed out and would soon cover the entire ends of the bones. These ends could then be put in apposition, and union of fragments would result. In our clinics, we have had to resort to this method in some old ununited fractures, in which we have had the process of repair again started. It is our opinion that compact bone, if it has the proper blood supply, is quite independent of either endosteum or periosteum for bone growth and for bone repair.

The whole process of repair of bone is fundamentally that which takes place in the union of the soft parts. In fractures of the bone we may have primary union, or, we may have secondary union by granulation tissue; this granulation tissue differs from graunlation tissue of the soft parts in that it is osseous in character. The injured tissues, infiltrated with blood, soon become invaded by leukocytes and effused blood plasma. Fibrinous coagulation takes place and the ends of the fragments are embedded in a dense, ill defined mass of firm, cellular exudate. The periosteum becomes much thicker, softer and more vascular; a thin layer of gelatinous or viscid liquid is found between it and the bone for a short distance from the edge of the fracture. In about fourteen days, the effused blood is completely absorbed, leaving a firm, dense, cellular, vascularized, partly organized mass of granulation tissue. The bone then undergoes rarefying osteitis, and the fracture becomes fixed. This is known as the "provisional callus."

While this process is going on, similar changes are taking place in the cancellous bone, and the "internal callus" is formed in the same manner. Ossification then takes place, thus completing the process of repair. While the callus is forming, the process of repair is going on in the contiguous soft parts, and they regain their normal condition and function.

Very briefly, the foregoing is what seems to take place in the process of repair of fracture of the jaws. Occasionally there may be an excess of rarefying osteitis, and a lack of production of osteoblasts, so that the callus may not ossify. In these cases, the bone is absorbed for a considerable distance between the ends of the fragments, and we have established a false joint or pseudo-arthrosis.

When an open or compound fracture becomes infected, suppuration ensues, and the process of repair is slower, because the suppuration of the wound delays or prevents the formation of the provisional callus, and it has to depend on the formation of the internal callus, which is not so favorable for rapid repair. In these cases, the callus is larger and more irregular than that which we see after simple fractures, when the process of repair takes its normal course.

Another phase of this subject which we shall consider briefly is some of the complications which occur in fracture of the jaws. Fractures of the jaws will differ from fractures in other parts of the body in that they are more liable to infection on account of the close proximity to the bacteria-laden fluids of the oral cavity. We rarely find infection present in simple fractures of the jaws, but it is quite common in compound fractures.

A factor which must be considered in relation to infection in fractures of the jaws is the presence of alveolar abscesses, which may be existing at the time of the fracture or may be superinduced by the injury. These will greatly delay the process of repair and should be eradicated before repair can be expected to take place.

In fracture of the maxilla, the antrum is frequently involved and may become infected. This makes another serious complication. It means clearing up the infection in the antrum before the process of repair will go on in a normal way.

Another rare complication in fracture of the maxilla is the fracture of the brain case, in which coma or even death may result immediately. Secondary hemorrhage is one of the complicating problems that is quite common in fractures of the jaws on the battle fields of Europe. This comes on after suppuration has been established and is the result of infective inflammation causing a disintegration of the hemostatic thrombosis, or ulceration or sloughing of the walls of the vessels. This secondary hemorrhage may occur any time between the beginning of the process of repair and the complete repair of the fractured blood vessels.

The laceration or severing of sensitive nerve trunks will lead to anesthesia of all of the parts peripheral to the fracture, and neuralgia is a common sequela.

Trismus is an early local complication that is nearly always present. This is usually brought on by the violence that is produced on the soft tissues and the temporomandibular articulation. In extreme cases, where it is not possible to make the reduction at once, the trismus may be so pronounced that a general anesthetic may have to be resorted to in order to obtain sufficient relaxation to make a diagnosis and subsequent reduction.

In gunshot fractures, there are other local complications, such as extensive laceration of the soft parts, which will greatly add to the difficulty of making a diagnosis and prosecuting the treatment. In these cases, there usually will be greater splintering and fissuring of the bone than in the fractures in civil practice. It is reported that in every case of gunshot fracture of the jaws, infection of the wound ensues immediately, which greatly interferes with the process of repair.

In the work at the Front on fractures of the jaws, the history shows that many of these cases are not treated until some time after the injury. Here a new complication arises. In these cases, frequently large masses of cicatricial tissue have formed, and a marked deformity is present. Under these conditions, a clear and definite diagnosis may be difficult, and the successful reduction of the fracture made arduous.

Another local complication, which is almost universal in gunshot fractures of the jaw and sometimes met with in civil practice, is loss of substance of the bone. Here again difficulties arise in making a successful reduction and subsequently retaining the fragments in normal relation.

Under the general complications of fractures of the jaws, there are a few factors that must not be overlooked. There are certain diseases which, when present, seem to hinder the process of repair. Such diseases as syphilis, alcoholism, tuberculosis and such chronic diseases as will cause a marked lowering of the vitality of the patient. These conditions always will delay union and may prevent it entirely.

It will not be out of place, perhaps, in this brief paper to say something regarding the prognosis in fractures of the jaw. The prognosis must vary greatly according to the location of the fracture, the character of it, the complications which are present or which follow and the age and resistance of the patient. The time which elapsed between the injury and the reduction of the fracture will also influence the prognosis. The prognosis should take into account several points: *First,* the effect of injury in respect to a favorable or unfavorable termination of the case; *second,* its simple or complicated course; *third,* the influence of each complication; *fourth,* the time required for recovery; and, *fifth,* the result as to normal occlusion of the teeth and normal functions of the jaws. The younger the patient, the more favorable the prognosis, because in the young fractures unite more easily and promptly than in the adult. If the fracture has existed two or three weeks previous to its reduction, and if there is considerable movement of the fragments, consolidation will not take place as rapidly after the parts have been brought into normal relation as it would if reduction were made at the time of the injury.

The presence or absence of infection plays a very important role in the duration of the treatment. In a simple fracture of the mandible where the fragments remain or are replaced in perfect contact, repair will take place at once without any untoward symptoms, without deformity or malocclusion, and without detriment to the functions of the jaws. If the fragments are not quite in apposition in simple fracture, but nearly so, the prognosis will be almost as favorable, although it will take somewhat longer for repair to take place and there may be some slight deformity manifested in malocclusion of the teeth.

All compound, comminuted and complicated fractures, which in their very nature present additional obstacles in the way of complete reduction, may not present so favorable a prognosis. In fractures of the superior maxilla, the fragments will not be subjected to muscle strain as those in the lower jaw, and the retention of the fragments in normal position will not be so complicated. Fractures of the condyle with displacement offer less in the way of favorable prognosis than any other fracture of the lower jaw. In these injuries there usually will be produced a traumatism in the temporomandibular joint which may later result in ankylosis.

Gunshot fractures of the jaws, which are necessarily in most cases compound and comminuted, are in a much less degree amenable to treatment than most other fractures. Splints for supporting the fragments must necessarily be more complicated, and infection is always present. All of these factors must be taken into consideration by the operator in forming a judicious prognosis in the treatment of fractures of the jaws.

Time will not permit us to discuss at length the treatment of fractures of the jaws. The treatment of these fractures consists in the fulfillment of three principal indications:

First: Reduce the broken fragments.

Second: Retain the parts in normal relation until consolidation has taken place.

Third: Prevent or control inflammatory processes.

No hard and fast lines can be drawn relative to the treatment of fractures of the jaws, for each case will present an entirely different problem.

In the treatment, the operator should aim to establish normal forms and normal function. The different forces, such as muscular tension, the force of gravity, movements of the tongue, etc., which tend to displace the fragments, must be taken into consideration in determining the methods of treatment.

Individual ingenuity must ever play an important role in the treatment of fractures of the jaws. Equally successful results will be obtained by means and methods that are wholly different. In the construction of splints, the aim should be so to design them that all parts of the mouth may be kept clean, without which normal repair will not take place.

DISCUSSION.

DR. THOMAS L. GILMER, Chicago: In war, especially in trench warfare, injuries above the clavicle occur in the majority of cases; therefore the jaws are often involved. It is almost impossible to have a fracture of the mandible that is not compound. And another complication follows that one—infection. It is frequently seen in cases of fracture in the mouth. It does not delay or prevent union, providing the infection is very slight. If the infection is extensive make an external openng and drain to prevent destruction of tissues.

I have not seen a single case of trumatism of the temporomandibular joint as a result of fracture in civil practice. In the treatment of these cases the main object is to approximate the fragments. The fracture will unite more quickly if the fragments are not immobilized. There seems to be a greater osteogenetic influence where there is slight movement. I have employed an orthodontist extension arch, fastening it to the teeth on the upper jaw as well as to the lower, and then securing the upper bar to the lower bar by wires. The mouth can be opened every day. If you do not use immobilizing appliances, the patient must be instructed that under no circumstances is he allowed to use food which will require mastication.

DR. TRUMAN W. BROPHY, Chicago: Some years ago I saw in Europe a method of passing a bar on one side which had several wire bands adjusted to the teeth which ran on a slide fixed to the other jaw and also were fixed by bands to the teeth. These bars run in slides, thereby holding the long fragment where it belongs and thereby preserving the occlusion of the teeth. We must never forget that we can hold the teeth in occlusion on the side of the long fragment. In case a great deal of bone has been lost, cicatrization will preserve the lines of the face. When a portion of bone has been lost, there is no better treatment than by following the principles laid down by Dr. Gilmer. If only the third molar is left, let it hold the fragment in its proper position. The teeth on that side will be held in position and the intervening space will be filled in by new bone arising from the periosteum. If we can hold these in approximation very often much bone will form. By employing the method of wiring the teeth together we succeed in getting a good union, though part of it is cartilaginous, or rather fibrous. The proper occlusion of the teeth is preserved.

DR. ARTHUR D. BLACK, Chicago: It might be of interest to know that in the Plastic and Oral Surgery Course of the Army the men are instructed that in every place where there is a fracture they are to make an external incision into the open space between the ends of the bone.

DR. JOHN E. NYMAN, Chicago: In treating these fractures we need some means of mechanical fixation quite apart from that supplied by the teeth. In one case of multiple fracture we used platinum screws and wires because we thought that they could be sterilized more easily. The result was excellent.

DR. ARTHUR ZENTLER, New York: Dr. Depage and his associates use a new nomenclature for jaw fractures, terming them according to location, premolar, retromolar, retropremolar, and right or left. At LaPanne they have adopted a new method of treatment. For instance, in a case of retromolar fracture of the mandible, they attach a band to a tooth in the part which is not loose. Another band is attached to a tooth in the loose portion. To these bands a heavy expansion arch wire was previously soldered which extends and overlaps a similar wire soldered on the other band. The fracture is reduced with the patient anesthetized, and with soft solder the overlapping ends of the wires are united in the mouth.

DR. A. W. McCULLOUGH, Pittsburgh: The first essential in reducing fractures is to secure apposition. Dr. Gilmer's wiring becomes rather tiresome to the patient after a few days and he wants it removed. I have used Angle's bands on the teeth, together with rubber bands attached to the upper and lower Angle's on teeth. Sometimes it works very nicely and gives the patient an easier condition of the muscles than we get when the jaws are wired together with immobilization. Regarding bands, we have used three or more bands, with bar attachments; bands of the Lukens design, that may be adjusted easily or changed, and which I prefer to cementing.

DR. FREDERICK M. MOOREHEAD, Chicago: Dr. Lyons' experimental work does not tally with the principles of bone regeneration as we understand them. It is understood that regeneration of bone must come from the osteoblasts, and that the periosteum per se has no capacity of bone regeneration. Dr. D. B. Phemister, of Chicago has proved that bone transplants without periosteum are quite as vital in their function as those with periosteum. One may take a section of bone from which the periosteum has been removed and then remove the subperiosteal layer by cutting it away and it will be found that that piece of bone has a certain capacity for regeneration, which must, of course, be found in the osteoblast. It must be true that in transplanting periosteum into muscles, as reported by Dr. Lyons, some of the osteoblasts were retained in the periosteum in its removal from the bone. The French method of treating fractures of the jaw is not to immobilize. Where there is no displacement and no tendency to displacement in muscle movement, a fracture of the jaw is more satisfactorily treated without immobilization than with it. Fixation and immobilizaton are necessary only where there is displacement, which cannot be controlled except by immobilization. It is doubtless true that the amount of movement occasioned by the muscle only acts as a stimulant and hastens repair.

DR. CHALMERS J. LYONS, Ann Arbor, Mich.: I think we are getting away from fixation of the jaw. We must retain the fragments when there is displacement. In mandibular fractures, where there is little or no displacement, we are getting away from the intradental ligation. The experience in fracture work of the men at the Front is going to bring out many new things. Ordinarily, where there is infection of the mouth we can get along much better without fixation. In gunshot fractures I question whether intradental ligation has much of a place on account of infection. The point Dr. Gilmer brought up about external openings is a method we have resorted to in many cases. If an abscess forms you must drain. If pus forms around a fragment, repair is going to be retarded. It is much better to make an external opening at once. Relative to Dr. Gilmer's point of the osteoblasts lying just under the periosteum, we all recognize this fact, and it is to this layer that Hey-Groves has given the name of epiosteum. It is the osteogenetic portion of the periosteum. Without this layer of cells, the periosteum has not the property of producing new bone.

THE RELATION OF THE DENTAL, ORAL AND NASAL SURGEONS.*

BY J. M. BRITTON, M.D., EL PASO, TEXAS.

THE RELATIONSHIP of the dental, oral and nasal surgeons is so intimately associated that it is often hard to tell where the one leaves off or the other begins. The field is so large that it will not be possible to go into many of the conditions in this short paper, so I shall confine my remarks at this time largely to the condition that is causing the greatest damage to the greatest number. This is mouth-breathing in childhood and infancy.

There is no question but mouth-breathing in childhood is doing more to retard the normal growth and development of the American child than any other one thing. The condition is found everywhere, in town, city and country. It is a condition that is amenable to treatment; a condition that can be relieved easily and without danger to the child, if taken in time.

I do not have to tell you gentlemen what the mouth-breathing child suffers from in a dental way—you know. You see and have to treat these children's teeth. You see the ruined arch, the misplaced teeth, the protruding jaw, the small, undeveloped nose, undeveloped antrum of Highmore. You see the effects of mouth breathing on the teeth and gums, for the sleeping child that is breathing with the open mouth allows the remnants of food in the mouth to collect and dry around the teeth. This in turn acts as a fertile field for the growth of bacteria that cause the teeth to decay. These are the things that you men see, but you do not see the conditions that are present in the noses of these children. You do not see the deflected septums, the nasal spurs, the congested mucous membrane in the nasal cavity, the blocking of all the nasal sinuses, the effects on the middle ear. These are the conditions that the nose-and-throat man comes in contact with, as a consequence of improper nasal respiration in infancy and childhood. The condition is not confined only to childhood, but follows the individual through life.

You know what the patients suffer when they have a suppuration of the antrum of Highmore. This condition is not comparable to what the same individual suffers who has an inflammation of the sphenoidal sinus, for the antrum of Highmore is easily drained and there is no danger as to life in this condition. But if the sphenoid is infected, there is danger as to life, for there is only a very small partition of bone between this sinus and the brain. It is very easy for you men to go into the antrum of Highmore through the alveoli and drain, with absolutely no danger to the life of the patient.

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*Read before the Southwest Dental Association, Jan., 1918.

The blocking of the nasal cavities from the enlarged tonsils and adenoids is the main cause of mouth breathing in children. When the nasal cavity is blocked in this way, it is impossible for it to develop normally. It is in these conditions that you find the high arched palate and the protruding jaw. For when the child breathes through the mouth during sleep, the force of the air striking the arch and the upper jaw, together with the negative pressure that exists in the nasal cavity at this time, causes most of the deformity of the features. Not only this, it causes a buckling of the nasal septum, which in turn causes a partial closure of one of the nasal chambers, and often both of them, for many times the septum is bent in the form of the letter S. These conditions cause a congestion of all the mucous membranes in the nose, which causes the blocking of the sphenoidal sinus, ethmoid cells, frontal sinus and the antrum of Highmore, and this congested condition produces a stasis in the region of the ethmoid cells, which in turn produce polypi in the nose.

Now if it is possible to prevent most of these conditions, and there is no doubt about most of them being preventable, if the child has the proper treatment at the right time, then we should do it. It is a question of a stitch in time saving nine. These conditions should be looked after in children as soon as possible—say from the second year on. The sooner the better. It is up to the dental surgeon to help the physician in these conditions. I think that in many instances and in many places that it will be largely up to the dental surgeon to lead the way. It is a fact, and I do not like to have to make the confession, but the members of the dental profession today, taken as a class, are more up to date in their profession than are the doctors of medicine. The days of the "Jackleg Dentist" are almost a thing of the past.

You men have to make a correct diagnosis. You have to do your work right. You cannot go by guess, for if you do not give your patients relief, they come back, tell you that the tooth is no better, or go across the street to a "good" dentist. Not so with the doctor of medicine. Many of you men know of doctors in your communities that have no equipment. Many of them never read any of the late books, take nothing but the very cheapest advertising medical journals, never attend a medical association meeting, but "get by" by jollying their patients along, by shaking their hands every time they see them on the street, and patting them on the back when they can. They make their diagnosis by taking the temperature, feeling the pulse, looking at the tongue and asking when the bowels moved last. If they make a bad diagnosis and the patient dies, they bury their mistake, and console themselves by saying that "The Lord giveth and the Lord taketh away." Now men like this are not competent to make a diagnosis. The child that is suffering with the trouble of which I speak can expect nothing from a man like this; for when the mother tells such a man that her child has a bad breath, terrors at night, that he seems to be choked up in the throat, sleeps with his mouth open, and snores, and that he cannot breathe through his nose, he proceeds to give him a good stiff dose of calomel, and tells that mother that the child's liver is not working right, or that he may have a little "catarrh," and perhaps gives him a spray or a gargle for the throat. Now this is what the poor child has to put up with.

If these conditions are ever corrected, it is going to be up to you folks to help us. You can make the diagnosis in many of these cases, and save the child a great deal of future suffering. It means so much to the coming generation to have these conditions corrected at the only time that it is possible to correct them. After the damage is done it is too late.

The nasal chambers, together with the post-nasal space and the antrum of Highmore, are the sounding boards of the human voice. Anything that interferes with the normal development of these spaces, injures the voice just to that extent. When the post-nasal space is blocked and filled with a bunch of adenoid vegetation, it is out of the question for the child to breathe normally through the nose, and it is not the adenoids alone that cause this. I feel that the tonsils do more harm to the growing child than the adenoids alone. I have many mothers bring their children to me with the statement that they think that the child has adenoids. Often they are correct. But more often the tonsils are doing more harm than the adenoids.

There is a report, just published in the December *Laryngoscope*, by Dr. Louis G. Kaemper of New York. He has charge of the nose and throat clinic of the out-patients' department of Mount Sanai Hospital, in which he reports on the condition found after the examination of 220 children that came to his clinic. He took them as they came in. His report shows, of this number, that 82 per cent. had tonsil troubles and that 49 per cent. had some pathological condition of the septum or nose. He does not give a report on the number that had adenoids, but as these conditions almost always go hand in hand, it is reasonable to surmise that a large percentage had them.

I have not time in this paper to touch on the conditions caused to the general health or the dire results that these conditions bring to the patient's ears. But will say this, that most of the deafness that we have to contend with is a result of mouth breathing in childhood.

There is one condition that the dental, oral and nasal surgeons have to deal with. It is on the border line. I refer to suppuration of the antrum of Highmore. You men go in through the alveoli, while we go in either through the nose or canine fossa. We either do the Caldwell-Luc or the Denker antrum. I think that we have a better operation than the one that you men do when you go in through the alveoli. We can see what we are doing, while you do your work largely by the sense of touch. You drain through the mouth, while we drain through the nose. Your patient is liable to swallow a lot of the pus from the sinus, and ours blow it out. I know that there is room for argument in these conditions. What we all look for in any condition is drainage, and we want it to drain out and not in.

A PLEA FOR A CLASSICAL EDUCATION FOR THE DENTIST*

BY S. M. MYERS, D.D.S., WACO, TEXAS.

IT IS NOT my intention, in presenting this plea, to cast any reflections upon any one who is practicing dentistry, nor upon any college that is teaching dentistry.

Every enterprise and every profession must have a beginning. When the first railroads were built, they were primitive affairs, indeed; the engines were small, the rolling stock was light, the rails were simply thin strips of iron, nailed on parallel pieces of lumber fastened to the cross-ties, and the roadbed was poorly constructed. Yet, primitive as they were, those railroads served the public well at the time. But the country developed, and the public demanded more of the railroads. More people wanted to travel, and they wished to travel faster; more freight had to be hauled, and the shippers demanded its prompt movement. These demands had to be met; but any attempt to move the heavy tonnage with the little engines resulted only in the spinning of the drivers on the rails, accompanied by the deafening roar of the exhaust and the expulsion of great showers of sparks.

Larger engines and heavier rolling stock were constructed. The all-steel rail was invented and laid. At first, it was light but amply sufficient. Nothing less than the firmest, rock-ballasted road-bed, the heaviest rails, and the largest engines of the latest construction are used to move, with safety and celerity, the enormous amount of tonnage that taxes the capacity of the railroads today.

Dentistry was first practiced by the versatile barber. After plying the razor on the customer's face and making his hair redolent of bay rum, the barber would turn his earnest attention to the offending molar. I am sure that he delivered a very learned discourse upon the origin of that molar, what caused the decay, where the decay began, and pointed to the dire consequences that would obtain were that molar not removed.

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*Presented at Meeting of the Texas State Dental Society, San Antonio, Texas, April 12th, 1918.

The circus would open with the "turn-key," the chisel, and the hammer; it would close with the exhibition of the molar, accompanied, most likely, by a large portion of alveolar process. Holding his trophy aloft and swelling with pride, the barber would receive the cheers and the praises of bystanders, who had been attracted into the shop by the shrieks and yells of his patient, who at that moment was writhing in pain, glad to have escaped with his life.

But dentistry gradually drew aloof from the barbershop and became a profession, with licensed men in the practice. The beginning was humble, indeed; and for years, the field of practice was very limited, and the duties of the dentist were quite simple. There was very little for the student to learn, as practically nothing had been discovered. But the profession grew apace. Year by year, new knowledge was added to that already obtained; instruments and appliances were invented; filling materials were discovered; and methods were devised for the treatment of diseased tissues.

At first, the student of dentistry studied for a few months, in the office of a practicing dentist; then he was permitted to practice in an office of his own. For a number of years, that amount of dental education and training sufficed; but by and by, the profession advanced far beyond the scope of the private preceptor, and colleges were established for the express purpose of teaching dentistry. The length of the course was two years, with only a few months' attendance each year; and the literary requirements for entrance were very low. As time passed, the term of attendance for each year was lengthened. Finally, the course was extended to three years, and some colleges now require four years of study.

The stigma of its humble origin as a profession clung to dentistry for many years, and a dentist was looked upon as an ordinary workman —as the shoemender, or the carpenter. But that impression has been gradually replaced by a genuine respect, till now the profession of dentistry is considered as one of the learned professions; and it has advanced more during the past ten years than any of the other professions—not excepting medicine. But while the profession has been advancing so rapidly, the large majority of its members have not kept apace with it. All advances have been made by a few men only who have been far in the lead, while the vast majority have been following in the distance. The leaders always have had, and still are having, a very great load to pull. It is nearly all dead weight for them, and this ought not to be.

The ranks of the dental profession are filled with men from the ordinary walks of life. We come fresh from the farm, from the machine shop, from behind the counter—from almost anywhere, except from the colleges and the universities. There are very few college and university graduates to be found in the practice of dentistry. Just why this is, I do not know.

Why so many men from the trades enter this profession is more easily accounted for. First, the literary requirements for entrance to nearly all dental colleges are very low, so that young men of a very limited education are admitted easily; secondly, because of the prevalent impression that the practice of dentistry is an easy way to make money—a financial bonanza.

For the latter impression, the dentist is mainly responsible. Did you ever see a dentist, asleep or awake, who did not say that he was as busy as he could be, had more work than he possibly could finish in a month, and had made at least six hundred dollars during the past month?

The laity have the impression that dentistry is a gold mine in full operation, with a United States mint attached and working over-time. With that impression indelibly stamped and impressed upon his mind, John Jones leaves the old mare and the plow standing in the field, and enters a dental college. He spends three years of precious time, and as many thousands of his old father's hard-earned dollars, trying to learn some of the deepest subjects that man's mind ever was called upon to study. At length, having been graduated, he opens an office in his county town, and, true to his kind, at once tells of the large practice the people are forcing upon him, and of the fabulous fees they gladly pay for his remarkable services; while in reality, his old father is quietly giving him money with which to pay his office rent and his board.

Henry Smith, John's nearest neighbor on the farm, and seventh-grade classmate at school, had been clerking in a drygoods store, which to a country boy is the highest pinnacle of success. He hears of John's great success in his newly-chosen profession, and listens with eager ears to the rumors about how easily money is made in dentistry. One day, he hears that John has made one hundred and fifty dollars during the past month, which seems a fortune when compared with his "eight-dollars-and-board" per week. Finally, after thinking the matter over, Henry decides to become a dentist; so, bidding his friends good-bye, he leaps over the counter to fortune and fame. There are thousands of these Johns and Henries in the dental profession.

With the opening of the twentieth century, an epoch-making era in the practice of dentistry began. New responsibilities devolved upon the dentist, and heavier tasks were laid at his door. The medical profession discovered that many diseases of the human body were accounted for by conditions in the oral cavity; and many cases of arthritis, arterio-sclerosis, high blood-pressure, appendicitis, and stomach troubles galore, were traced to the mouth as their origin. The medical profession has laid all squarely before the dentist. The great surgeon, Dr. Mayo, said, not long ago, that the dental profession must make the next move. "Will they do it?" he asked.

Now, the members of our profession are really accommodating, and are perfectly willing to make the move; but the tonnage is entirely too heavy for the great majority of our *mental engines,* and about all we can do in making the attempt is to spin our drivers on the rails, and to deafen every one with our verbal exhaust.

The time has arrived when every dental college should require that the applicant for entrance should hold the degree of Bachelor of Arts. We hear some one say that we do not need so much education to fill teeth. Another will argue that our fathers and our grandfathers practiced without so much literary education. Yes, our grandfathers read by the tallow candle; they used the ox-cart for transporting loads; they shot with the old flint-lock musket; they carried messages on horseback; they prepared the cavities in the teeth with chisels and excavators; they turned the polishing lathe with one hand while holding the plate to be polished in the other. We are not living then; we are living now, and are practicing dentistry now. Conditions have changed, and we must change to meet these new conditions.

In all the professions, the men and the women who have made the greatest successes in development are those who received the classical education before entering their chosen professions. Their minds were trained to think, and to think independently. And in order that the dentist of the future may be equal to his task, and be able to meet his responsibilities, he must have a vigor of mind such as the profession has not known and doubtless has not even conceived. And it is because the classical studies impart this vigor of intellect, and give to one a mind that will penetrate beneath the surface and beyond the limits of a far horizon, that I believe in them in the education of the dentist. Today, when the intellectual interests are diversified as never before, the need for men of broad culture is even greater than in times gone by. The day comes in the career of every dentist when, for the solution of some important problem for which he is responsible, he will need an elastic thinking power, qualified to hold fast to essentials and to cast aside nonessentials. And in order to attain his efficiency, he must express himself not only in the theory and the practice of his profession, but in doing his part to help in the solution of social, economic, and political problems. The broader his outlook, the greater will be his inclination to assume his proper share of responsibility in these fields of activity, and the more effective will be his work. The real value of a classical education to the dental student is to make a man, not merely a dentist.

The dentist should get all the vocational training he needs; but he should get as much more sound schooling as he can take, in the elements of general knowledge. He has a mind and a heart, as well as hands. Eyeskill and handskill are good, but mindskill is the only safe foundation upon which to build the eyeskill and the handskill. If he is to be more than an animate tool doing a daily stint of toil, he needs the joys and hopes of knowledge to help him rise in the scale of life, and to open glimpses into broad fields outside the little lane of his vocation. A classical education is the one which really educates, and it should be generally adopted and vigorously sustained for admission to dental colleges, if the profession is to rise above its mediocre accomplishments of today.

Men are "educated" when they are able to use their faculties with facility and accuracy upon any given subject that is presented to them. This is the greatest advantage of the study of Latin and Greek, and no exercise has been more admirably adapted for the purpose. The study of Latin and Greek carries with it a mental disciplining that is no less real than that to be derived from the study of mathematics. Francis Bacon said: "If a man's wits be wandering, let him study mathematics." He could truly have said the same of the study of Latin and Greek. Reading Latin and Greek keeps the attention close, keeps one weighing words, keeps one extracting all the meaning there is in words, keeps one coordinating words to get the fullest meaning, and in the study of these languages the art of discrimination and selection is developed to the highest degree. Each word of these languages has from one to twenty shades of meaning as expressed in English, and the discriminating between these many shades, and the selecting of the proper word in English to convey the exact shade of meaning that the author intended, develops those faculties of discrimination and selection which are so much needed by the dentist in his daily work. The student's observation is sharpened, his perception becomes more delicate, and he finds increased pleasure in the intensity with which he seeks fully and correctly to interpret the author's meaning. And this habit of close observation, of attention to detail, of looking for fine distinctions and shades of difference, and the alertness of mind possessed by an individual of these habits, prove of inestimable value to him. And these are the qualities of mind that are so absolutely essential to the dentist in his experimental and laboratory work, in his operating at the chair, and in meeting his patients at the door. Indeed, the progress of dentistry is determined largely by the accuracy and the precision with which observations are made. The careless or the superficial man is not suited either to the practice of dentistry or to the conduct of experiments for the elucidation of dental problems.

To work out the meaning of the Latin or Greek sentence requires all the mental process of logical induction, deduction, of drawing conclusions from a mass of facts, and of insight, that are used in the solution of complex problems that present, and the perplexing situations that arise, in the practice of dentistry. In the study of the classics, the value to us is that we are taught to think; and thought properly controlled is power. The discoveries of science are constantly opening new fields of dental effort, wherein the visions and the dreams of today become the realities of tomorrow. To imagine, to visualize, and by the application of human knowledge to create, that which adds to man's comfort and necessity, is no mean task. It is a task that requires a well-trained mind and a nicely-regulated judgment; characteristics probable as the result of a broad and liberal education, and improbable as the consequence of a purely technical or vocational education.

It is useless to train for the emergency, for emergencies are presenting themselves at every corner; and no two are alike. What the student should aim at is the most thorough and accurate mental discipline, that will train him to meet and solve all sorts of problems in which he can use neither the classics, nor the modern languages, nor yet his mathematics or sciences, but only the *capacity* which study of them all gives him to meet the requirements and emergencies of active life. The man who can do but one thing, I care not how well he does it, is rarely a good mixer. This one-sidedness is, of course, the result of his having vocational training only. The specialist—the man with only vocational training—has his place, it is true, does admirable work and stands high in the esteem of his associates; but apart from his profession he rarely shines. He lacks that ease, freedom, engaging address, and knowledge of the social and intellectual world, which alone are characteristic of the liberally cultured. Vocational training alone tends to materialism and commercialism, and cannot possibly lend polish, dignity, refinement, and elegance to one's life.

The young man who has obtained the degree of Bachelor of Arts has already had four years of training in anything he wants to do. If he should enter upon the study of dentistry, he is at the beginning far in advance of the student who has not been trained in the classics. He understands almost at sight the terminology used in all the subjects taught; he has a thorough knowledge of physics and chemistry, and can easily master the course in chemistry prescribed by the dental colleges. His mind already is trained to think, to reason, and to grasp readily anything that is put before him.

I do not claim that every one should study the classics; but if dental science is to be taught as anything more than mere memory work, it should be insisted that the prospective dental student be previously well trained and thoroughly grounded in the classics, for without this training his method of thought is apt to be diffuse, unsystematic, and inconclusive. Under any trade or calling, there should be a sound basis of culture; otherwise, the man may be made subordinate to the thing he does.

There was a period in the history of the world when man lifted himself above merely animal existence, and through the power of his mind established a new order of life which we are pleased to call civilized life. And in the study of the Latin and Greek languages, we at the same time study the embryology of our own civilization; for ours is the civilization that has come directly from that original civilization of Greece and Rome; and by coming in contact with the original languages, we come in contact with those original forms of thought that have made our civilization possible.

The study of Latin and Greek produces mastery of language and clarity of thought; and by studying them, we learn the habits of thought of older peoples, which gives us an excellent foundation for studying the minds of our own generation: for a thorough knowledge of human nature is of the utmost value to the dentist.

The modern world needs the ancient writings, not only because they furnish perpetual delight as models of style in speech and writing, but also because they touch the imagination, stimulate thought, and enlarge our view of man and nature as no other course of study can do. They furnish the background of all our intellectual enjoyment. The reading of the uncultivated man suggests merely the literal meaning of the words; while that of the cultivated man is filled with pictures called up by allusion and metaphor, rich in significance and beauty. However good a dentist he may be, it is that background which more than anything else enriches the mental life and adds to the joy of living—and that alone can be obtained from the study of the classics.

To the dentist, Latin and Greek are far from dead languages, for the terminology of medicine is founded upon these languages. There are approximately forty-one thousand words in Dunglison's dictionary, of which twenty thousand are derived from the Greek and twenty-one thousand from the Latin, the French, the Saxon, and the English. Of the latter group, the majority are derived from the Latin. New words must be added to the terminology of every live branch of science, and such words should be and are based upon the classical languages, in order to be adaptable without serious change to the modern languages. The teacher or investigator constantly meets such words in his work, and it certainly must be annoying to him if he be unable to surmise closely their meaning.

We are indebted to the Greek language for the names of some of our most useful inventions: the telegraph, writing afar; the telephone, sounding afar; the phonograph, writing by sound; the photograph, writing by light; the telescope, viewing afar; the microscope, viewing the small; the skiagraph, writing by shadow, and many more names and terms that come to us from the Greek.

Let us observe a few words in the terminology of our profession. Many of these words come to the English through two and sometimes three languages:

Physiology. Latin, from the Greek, *physis,* nature, and *logos,* discourse or treatise. A treatise on nature.

Physics. Old English, through the French, from the Greek, *physis,* nature.

Chemistry. French, from the Greek, *chymos,* infusion, juice, liquid; and is akin to the Latin, *funders,* to pour.

Anatomy. French, *anatomie,* through the Latin, *anatomia,* from the Greek, *ana,* up, and *temnein,* to cut. To cut up.

Bacteriology. Through the Latin, from the Greek, *baktron,* a staff or rod, and *logos,* a discourse or treatise.

Ethmoid. Greek, *ethmos,* a sieve, and *eidos,* form. Like a sieve.

Sphenoid. Greek, *spehn,* a wedge, and *eidos,* form. Like a wedge.

Sphincter. Latin, from the Greek, *sphiggein,* to bind tight.

Oxygen. French, *oxygene,* from the Greek, *oxys,* sharp, acid, and the root of *gignesthai,* to be born; *genes,* born. It was supposed at first that acids were formed by oxygen.

Hydrogen. Greek, *hydor,* water, and *genes,* born. It was supposed that hydrogen was the maker of water.

Chlorin. Greek, *chloros,* pale green, greenish yellow. So called from its color.

Iodin. Greek, *iodes,* violet-like; *ion,* a violet, and *eidos,* form. The name was given from the violet color of the vapor of iodin.

Platinum. New Latin, from the Spanish, *platina,* through Low Latin, *plata,* a thin plate of metal, and this from the Greek, *platus,* flat, broad. The metal was first found in the form of thin, broad flakes, and was so named.

Iridium. Latin, *iridis,* from the Greek, *iridos,* rainbow. This metal was so called from the iridescence of some of its solutions.

Terminology. Latin, from the Greek, *termon,* term, and *logos,* discourse or treatise.

Now let us look at a little word which, when it is mentioned, makes us all get chesty and strut. It is ethics, which comes to the English through the Latin, *ethicus,* from the Greek, *ethos,* custom, usage, manner.

In fact, nearly the entire terminology of all the subjects that the student of dentistry is required to study, is directly from the Latin and the Greek. And the student can in no way get close to their meaning unless he have a thorough knowledge of these languages. Without a full knowledge of the meaning of these terms, the student can do only memory work; and instead of digesting thoroughly and assimilating readily what he studies, he will have chronic mental indigestion and intellectual dyspepsia, accompanied by an obstinate oral dysentery, all his life. And the only way in which the subject can be made immune to this verbal amœba, is to inject the classical-education serum deeply above the eyes.

Not only is the study of Latin and Greek invaluable as a mind trainer and developer, and indispensable as the key to the terminology of our profession, but a thorough knowledge of them is necessary for the mastery of the English language. More than half of our words come directly from the Latin and the Greek, and many of our words that come to us from the modern languages have their origin in these two languages. A recent critic, in advising what should constitute the best English, has this to say: "Avoid Latin derivatives. Use terse, pure, simple Saxon." Now, if he only had taken the pains to consider what he was saying, he would have observed that, of these eight words, only "Saxon" is Saxon, and all the remainder are directly from the Latin.

Mr. Gladstone said: "Ninety-nine men out of every hundred never rise above mediocrity because the training of the voice is considered of no importance."

Dr. Charles W. Eliot, ex-President of Harvard College, made this statement: "I recognize but one mental acquisition as an essential part of the education of a lady or a gentleman, namely, an accurate and refined use of the mother tongue."

We express our ideas by written and spoken words. We speak more than we write; and the distinction of our expression depends entirely upon the mode of utterance and upon the choice of words to convey our thoughts. Conversation is for the ear, and the modulation of the voice is as essential for obtaining pleasing effects, as is the proper selection of words for conveying our thoughts. It is much more difficult to write than to talk, because we talk more than we write. Writing is for the eye, and in addition to the proper selection of words, there must be an exact arrangement of the words, the phrases and the clauses, in order to express to the eye our clarity of thought.

The time spent in studying words, in learning their different shades of meaning, in going into their innermost recesses—even to their very inception—and extracting all their meaning as the bee extracts the honey from the flower, is an investment that will pay handsome dividends on stocks that are always rising in value. This study of words should be the pleasure of every dentist; for the dentist should be able to speak with readiness and ease, and to write with facility and accuracy. He should be thoroughly acquainted with the classics of his mother tongue; for as bathing with water cleanses the body and keeps it healthy and strong, so reading the classics cleanses the soul and raises man above the petty, sordid affairs of life, putting him upon a high plane from whence he gets a broad, unobstructed view of the richer and more beautiful things of life.

A city is no greater than the character of its citizenship. An army, notwithstanding the greatness of its leaders, is not one whit stronger than the character, the efficiency, and the initiative of the individuals that compose its ranks. So, with the dental profession. Not long ago, I was talking with a dentist along this line of thought. He said: "One of my patients, a well-educated and delicately-refined lady, remarked to me, a few days ago, 'Doctor, the dental profession is all right, but the personnel of the profession is far below the literary standard that should be at the foundation of a learned profession.' " That is the point I am trying to drive home. Our profession is a great profession, and our leaders have accomplished great achievements and have brought many discoveries to our doors; but we are obtaining only common-place results, because we possess only common-place capacity.

During the last few years, much has been said and written about our not having been recognized by the medical profession, and many have shed crocodile tears over our failure to be received into the arms of our medical brothers. We have chafed because the public did not recognize our importance in the professional world; and at present, this recognition is coming at such a slow pace that the speed laws are an incumbrance upon the ordinance books, and the speed "cops" are a nuisance to the neighborhood. Several schemes have been evolved by which we hope to obtain this coveted recognition. One is that of a high-sounding name; as, "Stomatologist, Oral Surgeon, etc." And now we are striving to enter the medical college, in order that we may wear the cloak of the medical profession.

The ass, aspiring to higher things, longed to be recognized by the Shetland ponies and by the little boys and girls who were playing with them; and having failed after numerous attempts to gain this recognition, he devised this scheme: to dress himself in a beautiful Shetland pony skin, and tell them that he was the King of all the Shetlands. So, carefully pinning back his ears, he skilfully adjusted the pony skin, and after practicing the pony-step for a long time, he went over to where the ponies and the children were playing, and presumptuously announced that he was the King of all the Shetlands. But as soon as he spoke, they recognized his voice and told him that, in spite of all his masquerading and camouflaging, he was an ass still.

SPECIAL NOTICE

PLATINUM — IRIDIUM — PALLADIUM

GOVERNMENT REGULATIONS "LIMITING THE SALE, POSSESSION, AND USE OF THESE METALS AND COMPOUNDS THEREOF"

We have been requested by the War Industries Board (Platinum Section) to give publicity to the official form of certificate required from all (dentists) purchasers of "Platinum, Iridium, and Palladium or compounds thereof" by dealers operating under License Form 10x, issued by the Director of Mines, through the War Industries Board, which limits the purchase, possession, and sale of dental supplies containing these metals. The form follows:

The following extracts from the Rules and Regulations under the Act of Congress of October 6, 1917 (40 Stat. 385) as amended by the Act of July 1, 1918 (Pub. 181) limiting the sale, possession, and use of Platinum, Iridium, and Palladium, and compounds thereof, apply particularly to users of and dealers in dental supplies containing these metals:

PLATINUM CERTIFICATE

To..(Dealer's name).

I, the undersigned, hereby certify that I do not possess one ounce troy, or more, of unmanufactured Platinum, Iridium, or Palladium, or compounds thereof (including crude, scrap, filings, polishings, or sweeps), and will not possess dental supplies (excepting artificial teeth) containing Platinum, Iridium, and Palladium, or compounds thereof, in excess of my known requirements for thirty days.

[SIGNED].................. (*Purchaser*).

Date ....

REGULATIONS

SECTION 1. The War Industries Board is hereby designated, under section 21 of the Act of October 6, 1917, and the President's proclamation of October 26, 1917, as the agent of the Director of the Bureau of Mines in the execution of the regulations as hereinafter indicated.

SEC. III. From and after the date of these regulations, under the penalties prescribed by section 19 of the Act of October 6, 1917, no person shall without a license—

Par. a: Purchase, sell, barter, or deal in unmanufactured platinum, iridium, or palladium, or compounds thereof (including crude, scrap, filings, polishings, or sweeps), except that sales may be made without a license to an authorized agent of the United States or to a licensee authorized to purchase the same; or possess for more than 90 days after the date of these regulations one ounce troy, or more, of such unmanufactured platinum, iridium, palladium, or compounds thereof.

Par. b: Possess, use, sell, purchase, or barter, for purposes connected with his business, platinum, iridium, palladium, or compounds thereof (except that sales may be made without license to an authorized agent of the United States, or to a licensee authorized to purchase the same), if such persons be engaged in—

No. 10: Manufacturing and/or distributing dental supplies containing platinum, iridium, or palladium, or compounds thereof.

Sec IV. Application for licenses shall be made under oath to any licensing agent duly authorized under the Act of October 6, 1917, as provided in the regulations issued under this Act.

Sec. V. Every applicant for a license will be required to submit with his application a sworn inventory of all platinum, iridium, or palladium, or compounds thereof, in his possession or control; and every licensee will be required to submit at such times as may be designated by the War Industries Board a sworn inventory of his holdings of platinum, iridium, or palladium, or compounds thereof, in whatever form they may be.

The Director of the Bureau of Mines, at the request of the War Industries Board, may at any time require from any user or possessor a detailed sworn inventory of any and all materials held by him containing platinum, iridium, palladium, or compounds thereof, and such inventory must be furnished promptly upon receipt of such requirement.

Sec. VI. All licenses shall be issued in the name of the Director of the Bureau of Mines and countersigned and delivered by the War Industries Board and shall be and remain subject to the following conditions:

Par. a: Each license shall contain such appropriate conditions as the Bureau of Mines through the War Industries Board, may impose.

Par. b: The Bureau of Mines through the War Industries Board may change the conditions of the license from time to time, as it may deem necessary.

Par. c: Records shall be kept by each licensee of all his sales, purchases, and other transfers of platinum, iridium, or palladium, or compounds thereof, and of articles containing platinum, iridium, or palladium, or compounds thereof, with the names and addresses of the purchasers, sellers and/or transferees, and the quantities involved, which records shall be open at all reasonable times to the duly authorized representative of the Director of the Bureau of Mines.

Par. d: Any and all platinum, iridium, or palladium, or compounds thereof, acquired under the authority of such license shall be used strictly for the purposes and in the manner stated in such license.

Par. e: Upon request of the War Industries Board, the licensee shall report the prices at which sales of his products containing platinum, iridium, or palladium, or compounds thereof, are being made, and the right to prohibit further sale of such articles at prices deemed exorbitant by it is reserved to the War Industries Board.

Sec. VII. Any licenses issued hereunder may be revoked for violation of any of these regulations, or for violation of any of the conditions contained in such license, or if such revocation is deemed necessary or advisable for purposes of the national security and common defense.

Sec. VIII. The War Industries Board will, upon request furnish a list of Government agents or licensees authorized to purchase platinum, iridium, or palladium, or compounds thereof. Neither the United States nor its representatives will assume any responsibility, financial or otherwise, where sales are made to licensees.

Sec. IX. The prices at which platinum, iridium, or palladium will be purchased by a duly authorized agent of the United States, or by such licensee as may be authorized to purchase or sell platinum, iridium, or palladium, or compounds thereof, will be such prices as may be determined by the proper governmental agency authorized to determine such prices.

SEC. X. Whenever such Government agents and such licensees as may be authorized to purchase platinum, iridium, or palladium, or compounds thereof, shall refuse to purchase the same from any person who is compelled by these regulations to sell the same, or is forbidden by these regulations to possess or use the same, then such person shall promptly notify the Platinum Section, War Industries Board, Washington, D. C.

SEC. XI. These regulations shall not operate to relieve any person upon whom an order requisitioning platinum, iridium, or palladium, or compounds thereof, may have been or may hereafter be served, from any obligation imposed upon him by such order.

PENALTY

SECTION 19 OF THE ACT OF OCTOBER 6, 1917:

That any person violating any of the provisions of this Act, or any rules or regulations made thereunder, shall be guilty of a misdemeanor, and shall be punished by a fine of not more than $5000 or by imprisonment for not more than one year, or by both such fine and imprisonment.

LICENSE CLASSIFICATIONS

AFFECTING DEALERS IN OR USERS OF DENTAL SUPPLIES CONTAINING PLATINUM, IRIDIUM, AND PALLADIUM, AND/OR COMPOUNDS THEREOF.

No. 4: To purchase in any form which requires refining or smelting, and to possess for a reasonable time, the platinum, iridium, and palladium produced as a primary product or as a by-product of the smelting or refining. (See Section III, par. A, of Rules and Regulations regarding sale.)

No. 10-x: To purchase and possess and to sell to dentists (upon their certification that they will not possess more than a 30-day requirement, excepting artificial teeth), dental supplies containing platinum, iridium, and palladium, and/or compounds thereof.

(*a*) To purchase and possess in an amount equivalent to their known 30-day requirements, and to sell to dentists (upon their certification that they will not possess more than a 30-day requirement, excepting artificial teeth) dental supplies containing platinum, iridium, and palladium, and/or compounds thereof.

(*b*) To purchase and possess in an amount equivalent to their known 60-day requirements and to sell to dentists (upon their certification that they will not possess more than a 60-day requirement, excepting artificial teeth) dental supplies containing platinum, iridium, and palladium, and/or compounds thereof.

(*c*) To purchase and possess in an amount equivalent to their known 90-day requirements and to sell to dentists (upon their certification that they will not possess more than a 90-day requirement, excepting artificial teeth) dental supplies containing platinum, iridium, and palladium, and/or compounds thereof.

No. 13: To purchase and possess scrap, filings, polishings, and sweeps containing platinum, iridium, or palladium for re-sale to the United States Government or to licensees authorized to purchase same.

All communications regarding applications, licenses, inventories, or other matters pertaining to these regulations should be addressed to

PLATINUM SECTION
WAR INDUSTRIES BOARD
WASHINGTON, D. C.

Ohio State Dental Society

53d Annual Meeting

Memorial Hall, Columbus

Three-Day Session, December 3-5, 1918

DR. D. A. HOUSE, Indianapolis ....*Gold Crowns*

DR. F. M. WADSWORTH, Minneapolis—
Articulation Partial Dentures

DR. A. M. DAVIS, late address, Berlin, (Formerly Kaiser's Dentist).

Symposium by Women Dentists—
In charge DR. GILLETTE HAYDEN

Papers by—KATHRYN GOETTE, Cleveland;
ELBERTA S. ROSA, New York;
LILLIE D. ATKINSON, Columbus

The Personal Care of the Teeth—
DR. GRACE ROGERS SPAULDING, Detroit

Military Features—
MAJ. C. VICTOR VIGNES, President N.D.A., New Orleans;
COL. J. H. SNAPP, MAJ. J. D. EBY,
MAJ. W. A. HECKARD, and others.

Complete and Comprehensive Clinics

WEDNESDAY EVENING
COMPLIMENTARY DINNER TO DR. HOMER C. BROWN

MEMBERS OF OTHER SOCIETIES CORDIALLY INVITED

Early Hotel Registration Advised

F. R. CHAPMAN, *Secretary.*
305 Schultz Bldg., Columbus Ohio.

CORRESPONDENCE

Preparedness League of American Dentists

News and Notes

COMMUNICATION FROM THE PRESIDENT.

Our Director-General is planning to give, through the members of the League, free dental service to such families of soldiers, sailors and marines as shall be found worthy by the Home Service Department of the Red Cross.

This is a most commendable activity of the League and should be supported by its entire membership. Only necessary service will be rendered, with special reference to children and expectant mothers who will, doubtless, make up the greater percentage of cases requiring treatment.

It is possible that some members of the League may not be in full accord with this plan, but to such I would say that we have thus far undertaken no more necessary nor worthy activity. Suppose that you were in the trenches more than three thousand miles away from your wife and your children who were left without sufficient support, suffering far more than yourself, in patience and silence. Would you not be cheered and thankful to know that skilled dentists stand ready to give them the best service within their power? Would it not fill your heart with thanksgiving and your cross easier to bear?

Then, for the sake of your conscience, your love of your own flesh and blood, do not advance a single argument against this great work, but add it to your already overburdened duties and the blessings of real sacrifice will be yours throughout your lifetime. It is far better to sacrifice than to regret. Now is the time when every ounce of skilled energy must be utilized to the glory of our flag, our profession and humanity. All true Americans are learning to give and to sacrifice and surely no more worthy objects can be found than the wives and children of the men who are making the supreme sacrifice that our beloved country may remain clean and fit for the living as well as for the myriads yet to be born.

THE RED CROSS AND THE DENTAL MOTOR CAR.

The Red Cross will accept and ship to France all dental motor cars turned over to the Government by the League, and promises that they will be used for care of the soldiers only. With this assurance the League is ready to begin active work in supplying them as rapidly as possible.

Members of the Dental Corps in France are anxiously awaiting their arrival and we have many letters urging us to get the cars over there as there is the greatest need for them. Commanding officers have promised co-operation and it is now up to the League to supply the demand.

Fifteen cars have been completed, some of which were ordered by the Italian Government for child welfare service. No development has created greater interest in our profession, especially by the public, than our dental motor car.

Let every organized body of dentists plan immediately to raise money for this purpose and I suggest that the officers write Dr. S. Marshall Weaver, Chairman, 620 Rose Bldg., Cleveland, Ohio, for full instructions.

This matter is vital, therefore urgent.

OUR INSTRUCTION COURSE.

Conditions generally in the educational department of our profession have been so unsettled while undergoing the changes subsequent upon militarizing dental institutions that those in charge of arranging a course of instruction in war oral and dental surgery have been unable to make definite arrangements in this most essential matter.

In the meantime, data is being compiled, plans formulated and co-operation of instructors gained so that when the word is given to proceed we will be ready for action. The situation has worried your President greatly as he has endeavored to establish a reputation for the League of accomplishing every good object undertaken and it is no idle assurance to say that we are on the job to see this object a big success.

RECLAIM.

Colonel Logan asks all League members to reclaim men dentally defective and put them in Class 1-A. We will back him up in this and do our bit to make an army of five millions. *THE WAR IS NOT YET WON.*

J. W. Beach, *President.*

American Red Cross Dental Ambulances

And now they are utilizing dental ambulances in France, that American soldiers may have healthy mouths, with consequent good digestion and health. The first two of these dental ambulances on record were equipped through the efforts of Mrs. William Boyce Thompson and given through the American Red Cross to the Dental Department of the United States Army.

These ambulances have all the appurtenances of the modern dental office, with the added advantage of being able to visit the patient in all sorts of out-of-the-way places. They consist of a main operating room and two good-sized tents. Every contrivance approved by the dental profession is installed in the ambulance.

In the center room, or office proper, is a complete dental outfit, with separate bracket for instruments, electric engine, fountain cuspidor, pressure tank with syringe and sprays, hot and cold water faucets, steam sterilizer, filter, vulcanizer, electric lathe, blow pipe, nitrous oxid and oxygen gas apparatus, sanitary cabinet for instruments, a full set of forceps and duplicate sets of instruments. There is even a typewriter for office record use.

The. car is lighted by electricity generated by batteries especially built for the ambulance. Should they fail, provision is made for acetylene gas lighting.

When the car is in transit a field outfit, which closes up in three containers, is stored in the office. This is set up as soon as the car is ready for service. On either side of the office is a tent, one used for the field outfit; the other is converted into sleeping quarters or it may be used as an adjunct operating room.

While dental treatment is being given in the office, one of the tents may be used for the more difficult operations. The car is manned by a crew of two officers, two dental assistants and a chauffeur. In hot weather the sides of the tent may be rolled up, insuring all possible ventilation.

One of these ambulances is in active service at Camp Upton, the other at Camp Greenleaf. In all camps, newly arrived draftees carry with them trifling ailments—measles, mumps, and the like. The men are quarantined and as they cannot go to the dentist, the dental office honks up to them.

Camp Meade also has a dental ambulance, the gift of the Cleveland Unit of the Preparedness League. The Connecticut Unit provided funds for another which is going to France to serve our boys at the front. The Red Cross has thirteen of the dental ambulances, either completed or in proecss of construction. Three of them are for service in France and the other ten (three dental ambulances and seven baby-saving trucks), are on their way to Italy.. All thirteen will go "over there." The Red Cross considers that the work among the babies and children of the war-swept lands will do much to rehabilitate future generations.

In order to continue this work and to provide for the greatly increased number of men who are being sent overseas monthly, the Red Cross will need the united support of the American people, that its mission of mercy and humanity may not be halted. For that reason the Red Cross will hold its second annual Christmas roll call during the week of December 16th to 23rd, when, it is hoped, every American man, woman and child will place his or her name on the Red Cross roster.

Last year 22,000,000 adults and 8,000,000 children responded to the call and took a nation-wide pledge to stand squarely behind the Flag in our war for justice and liberty for all.

The above paragraphs, under the heading, "American Red Cross Dental Ambulances," is matter which has been received direct from the Publicity Bureau of the Eastern Department of the Red Cross. It is therefore authentic. All League officers are requested to have this published in their local newspapers during the next Red Cross Drive, which will begin December 16th.

R. OTTOLENGUI. *Director of Publicity.*

CANADIAN OFFICIAL PHOTOGRAPH. COPYRIGHT BY UNDERWOOD & UNDERWOOD, N. Y.

A CANADIAN DENTIST AT WORK OUTSIDE HIS HUT

Tommie's teeth must always be kept in fine trim in case Fritz catches him in a bad fix. Of course that is not the safest way of handling the Boche, but at times even that has proven effective. This Canadian Official Photo shows a Canadian Dentist attending to sufferers. Part of his hut was made from the canvas of a fallen plane.

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M S., D.D.S., COLUMBUS, OHIO

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.)

Plaster Impressions

To remove plaster impressions from model, soak in hot or boiling water for one minute.—*Commonwealth Dental Review*

To Finish Plates

After filing or scraping, use a leather washer (same as are used for the ordinary water-tap), on the lathe in conjunction with equal parts of pumice and emery powder (knife polish). This quickly takes out all scratches without the use of sand paper. Proceed with the brushes in the usual manner.—*Oral Health.*

Inlay Gold

Coin gold is used by many operators for inlays; it is alloyed with copper and the formula never varies. It presents a hard surface which resists the force of mastication; it is easy to manipulate and makes an ideal casting. However, many dentists object to the reddish color of the copper and prefer the greenish color produced by a gold and silver combination and it has been my experience that different patients will be better served by a careful selection of color, even in gold.—*Chester Charles Clark, American Dentist.*

Silvol

This new drug of Messrs. Parke, Davis & Co. will be found extremely useful to the dentist. Personally, I have adopted the routine of swabbing out sockets after extraction with a 5 per cent. solution of it. In a number of cases of difficult extractions (particularly of lower third molars), where one generally expects a good deal of inflammatory reaction, I have been pleased to find a minimum of discomfort to the patient, after using silvol freely as above suggested. My routine practice is, first, iodin; then infiltration of anesthetic (or "conductive anesthesia," as the case requires); then extraction; and, lastly, application of silvol.—*R. S. Boys, Commonwealth Dental Review.*

To Clean Cast Gold and Inlays

In a small rubber cup (hard rubber) I have a solution of hydrofluoric acid, about two-thirds water, in which I place my inlays for many hours, always over night. Of course, they should be cleaned by heated sulphuric acid, two-thirds water, first. You have no fumes nor splash and get brighter gold.—*J. W. Landrum, Oral Health.*

Basswood for Counter Die

As a counter die for stamping gold plate over small fusible metal dies in crown and bridge work, procure a piece of inch basswood board and cut it in pieces say two or three inches wide by five or six inches long. Roughly form the gold over the die, and drive it on with an ordinary hammer, using the end grain of the basswood against the gold. The gold is properly stamped in five seconds. Saw the stamped end of the basswood block off as needed. Basswood is fine grained, soft, does not split easily and stamps the gold true.—*F. D. Price, Oral Health.*

Trim the Process After Extracting

Wherever there is an extraction of a number of teeth, we should consider the patient's comfort, and remove the sharp edges, even if nothing else is done. It is such a simple thing. You are anticipating Nature, and you are reducing at the time something that the patient would have to wait a long time for, before having a plate made. The surgeon would laugh at such a thing, because it is so simple; and yet because it is a surgical operation, in the past dentists have avoided this plain duty.—*S. H. Guilford, Dental Items of Interest.*

Use of Books and Journals

The dental profession has too long borne the stigma of not being a reading profession. Most salesmen for publishing houses of dental and medical books "pass up" the dentist because he does not buy any way. The claim made by some of the profession, that space for a bookcase in the office is too valuable for other purposes, is not well considered. A prominent member of one of our state boards, when asked about the need of dental literature and study clubs for each man in our profession, pointed to his library composed of his old college books and the files of a dental journal and remarked, "The journal is all I need, for it sums up everything that is worth while."

One journal, if read, is better than none at all. But, to my mind, the least number of journals should be placed at four or five, and then some system of reading should be followed, so that the material in these journals may become a part of each man's life and practice.

With careful reading and study of current dental literature and faithful work at study clubs we can attain a high standard of efficiency and service.—*F. W. F., Pacific Dental Gazette.*

To Protect Synthetic Cement Fillings from the Saliva

Instead of using wax or the varnish supplied by the manufacturers, use ordinary surgical collodion; it is cheaper and better.—*Cecil Norton, Commonwealth Dental Review.*

NEW PUBLICATIONS

Technic and Scope of Cast Gold and Porcelain Inlays, with a Chapter on Endocrinodontia, or the Ductless Glands—Their Expression in the Human Mouth. By Herman E. S. Chayes. D.D.S., New York City. St. Louis, C. V. Mosby Co., Pub., 1918. Price, cloth, $7.00.

The practitioner of dentistry today would not be giving patients his best service if he did not understand thoroughly the making of porcelain and cast gold inlays. Dr. Chayes in this volume of 392 pages treats the subject in a progressive and masterful manner. He has achieved merited recognition in this class of dentistry and the information he has to give has been eagerly sought. In the book he has set forth his views so logically that the reader can grasp and assimilate the information to the best advantage.

It is an authoritative presentation of the subject and the 372 engravings add materially to the elucidation of the text. A chapter on endocrinodontia, or the relation of the ductless glands to the mouth, has been incorporated. It is a valuable work and the excellent paper and presswork make it an attractive volume.

Surgery and Diseases of the Mouth and Jaws, a Practical Treatise on the Surgery and Diseases of the Mouth and Allied Structures. By Vilray Papin Blair, A.M., M.D., F.A.C.S., Professor of Oral Surgery in the Washington University Dental School and Associate in Surgery in the Washington University Medical School. Third edition. St. Louis, C. V. Mosby Company, Pub. Price $6.00.

In this, the third edition of this excellent work, the revision says the author, is mostly confined to the parts related to injury and sepsis and their treatment and was done by the section of Surgery of the Head, subsection of Plastic and Oral Surgery, as an expeditious method of giving, in a correlated form, the sum of the observations of the many workers abroad, to whose reports and recommendations, published, written and verbal, this section had access.

The subject of peridental infections has been rewritten by Dr. A. D. Black, Chicago.

The chapter on local anesthesia has been revised by the author, Dr. H. Prinz, and that on general anesthesia by Dr. Ellis Fischel. The abstracting of the war literature and much of the assembling was done by Capt. R. H. Ivy, Med. Reserve Corps, and further assembling by Capt. C. V. Loeb. Med. Reserve Corps.

Matters referring to the repair of defects have been included in this revision, to which have been added some recent observations on cancer of the mouth. 460 illustrations are given throughout the text.

Oral Sepsis in Its Relation of Systemic Disease. By William W. Duke, M.D., Ph.B., Prof. Experimental Medicine University Kansas School of Medicine; professor in Department of Medicine in Western Dental College, etc. St. Louis, C. V. Mosby Company, Pub. Price $2.50.

This subject is one of special importance to the dentist and one the average dentist should understand better than he does. In this book the author has endeavored to present, as briefly and clearly as possible, the rather complex relationship which frequently exists between infections of the gum and alveolar process and certain systemic disorders. This has necessarily involved a discussion of some of the more complex problems of bacteriology, immunology and pathology, as well as of dentistry.

For the proper care of many medical cases the intelligent co-operation of the dentists is absolutely essential. The welfare of the affected individual demands that the dental surgeon understand the relationship of oral sepsis to systemic disease and be prepared to at least assist physicians in diagnosis and treatment of such cases, for dental sepsis is an extremely common condition and it may cause serious systemic disorder in many different ways.

No dentist can afford to remain ignorant on such an important subject.

Interpretation of Dental and Maxillary Roentgenograms. By Robert H. Ivy, M.D., D.D.S., Major M. R. C., U. S. Army; Associate Surgeon, Columbia Hospital, Milwaukee; formerly instructor in oral surgery, University of Penn. St. Louis, C. V. Mosby Company, Pub., 1918. Price $2.50.

The purpose of this book is to present to members of the medical and dental professions the data necessary for making an intelligent diagnosis of pathologic conditions about the teeth and jaw bones, in which Roentgen examination plays a part.

It is much easier to learn to make Roentgenograms than it is to interpret them, and so the author has given more space to the latter in this work. The Roentgenograms used in the text are negative reproductions; they correspond with the original negatives in that the bone and hard tissues are light, and the soft tissues and spaces are dark, so that in studying these illustrations there is a near approach to natural conditions found in the original negative. 259 engravings are used to illustrate the book. It is a handy little volume, filled with instructive information that every dentist should possess.

Dental and Oral Radiography. A Text-book for Students and Practitioners of Dentistry. By James David McCoy, D.D.S., Professor of Orthodontia and Radiography, College of Dentistry, University of Southern California, Los Angeles, California. Second edition. St. Louis, C. V. Mosby Company, Pub., 1918. Price, cloth, $2.50.

The awakening of the rank and file of the profession to the necessity of a more universal adoption of the X-ray has been slow, and it is doubtful if some ever will become fully conscious as they continue to exhibit a lethargy toward this field which is either indicative of lack of foresight or sheer laziness. The X-ray offers one of the greatest diagnostic means of many dental and oral pathological conditions and should be used more universally by dentists who want to stay in the ranks of the progressives.

This book is essentially a work for beginners, and as the majority of the dental profession are still to be regarded as beginners in this branch it will prove helpful to every practitioner who desires to learn how to make Roentgenograms and interpret them correctly. 123 illustrations are used in the text. This edition has been entirely reset, enlarged and many new illustrations added.

Army Dentistry. Forsyth Lectures for the Army Dental Reserve Corps. Edited by Frederick A. Keyes, D.M.D., former visiting dentist, St. Vincent's Orphanage, Boston; consulting dentist, Medfield State Hospital; Librarian and Curator of the Museum, Forsyth Dental Infirmary, Boston. New York, D. Appleton & Co. Pub., 1918.

The greater number of chapters in this book are taken from the lectures given in the course in Army Dentistry for the benefit of those dentists who might desire to enter the service of the government in its prsent crisis. They adhere as closely as possible to a course which has been authorized by the Surgeon General of the Army and Navy. The subjects treated in the text are: Surgical Anatomy of the Mouth; Recent Advances in Physiology; Dental Pathology and Bacteriology; Chemistry, Physics and Metallurgy; Pharmacology; Pre-operative and Post-operative Medical Care of Patients; Maxillary Fractures, Medical and Surgical Treatment; Extraction of Teeth; Novocain Technic; Surgical Technic and Bandaging; General Anesthesia, Pharmacology and Administration; Military Roentgenology for Dentists; Venereal Diseases and Diseases of the Mouth and Nose; Appearances of the Mouth in Some of the Common Infectious Diseases; Recent Advances in Dental Surgery and Technic; Military Administration; Military Dental Laws. The book contains 75 pages of text and has 171 illustrations.

The Normal and Pathological Histology of the Mouth, being the second edition of The Histology and Patho-histology of the Teeth and Associate Parts. Revised and enlarged. By A. Hopewell-Smith, L.R.C.P., London; M.R.C.S., Eng., and L.D.S., Eng.; Professor of Dental Histology, Pathology and Comparative Odontology, University of Penn., etc. Vol. I. Normal Histology. Philadelphia: P. Blakiston's Son & Co., Pub. Price $4.50 net.

This second edition has been thoroughly revised and enlarged. Supplementing those first described in the first edition, originality can be claimed for the observation, investigation, recording and naming of several new pathological conditions of the human dental tissues, e. g., Nanoid Dentine; Odontoceles, extra-capsular and sub-capsular; diphyodontic gemination; hydropic degeneration of the oral mucous membrane; fibroid degeneration of the alveolo-dental periosteum, etc.

The author also makes some changes in terminology: Epiblast and mesoblast are now ectoderm and mesoderm; the medullated and non-medullated nerves become myelinic and amyelinic; the dental follicle is designated dental capsule. The term granuloma is omitted from the book, for the author says that the term does not conform to the correct definition of a tumor, and is in no sense a new growth. 160 new and original photographs and micro-photographs have been added to the text.

Dental Electro-therapeutics. By Ernest Sturridge, L.D.S. (Eng.), D.D.S., Fellow of the Royal Society of Medicine, member British Dental Association, member American Dental Society of Europe, etc. Second edition, revised. Philadelphia, Lea & Febiger, Pub., 1918. Price, net, $2.75.

This edition has been thoroughly revised and brought up to date with the addition of some new matter and illustrations. The work is specially intended to bring forward the value of electro-sterilization in treatment of root-canals and periodontal diseases, and this part has been rewritten with the intention of explaining more fully the technical details of ionization treatment. The author repeats a word of warning to all who undertake this method of treatment: "Do not approach the subject lightly; study carefully sufficient electro-physics to understand the various phenomena of the current with which you are dealing; and obtain a knowledge of the electro-physiological effects; then the therapeutic effects will be most gratifying."

A most excellent book on this subject, thoroughly practical, concisely written and well illustrated.

General Pathology and Bacteriology for Dental Students. By Guthrie McConnell, M.D., Director of the Clinical and Roentgenological Laboratories of the Waterloo Medical Society, Iowa; Captain, Medical Reserve Corps, U. S. N.; formerly Professor of Pathology and Bacteriology in the Philadelphia Dental College. Second edition, revised; 12mo of 314 pages with 109 illustrations. Philadelphia and London, W. B. Saunders Company, 1918. Cloth, $2.50 net.

While pathology and bacteriology are of importance to the dentist, there is much in the medical text-books on these subjects that can be well omitted from the dental curriculum, and for that reason this book was written. In its preparation the author has endeavored to have it contain a full presentation of general pathology and bacteriology and what additional along special lines as has been considered essential. With a complete knowledge of the basic principles of these subjects, the student will then be able to apply them to his work, and later, if he so desires to specialize.

On account of the recognized importance of focal infections in their relation to general disturbances, a more thorough presentation of them is given in this second edition. There also have been numerous additions to make the text more complete. Many new illustrations are given, and everything done to bring the book up to date.

A Laboratory Manual of Qualitative Chemical Analysis. By A. R. Bliss, Jr., M.D., Ph.G.. Professor of Pharmacology, School of Medicine, Emory University, Atlanta, Ga.; formerly Professor of Chemistry and Pharmacology, Graduate School of Medicine, University of Alabama. Second edition, revised and reset; 194 pages, with working tables. Philadelphia and London, W. B. Saunders Company, 1918. Cloth, $2.25 net.

As the title indicates, this is a laboratory manual of elementary qualitative chemical analysis for students of medicine, dentistry, pharmacy and science. This second edition has been thoroughly revised. The lists of compounds and preparations which followed each cation and anion, and the blank pages for the writing of equations, have been eliminated in this edition in order to make the manual more compact. The introduction has been enlarged, the old "Group 4" of the cations has been split into smaller groups, a separate chapter on the analysis of an unknown added, insoluble substances considered, the analysis of metals and alloys included, and a table of solubilities added. These in addition to numerous less important changes and additions.

Elementary and Dental Radiography. By Howard Riley Raper, D.D.S., Professor of Roentgenology, Operative Technics, Materia Medica and Therapeutics at the Indiana Dental College, Indianapolis, etc. New York, Consolidated Dental Mfg. Co., Pub.

This is the second edition of this popular text-book and it has been fully revised. The author, however, adheres to the arrangement of the first edition; i. e., the first part of the book is written to instruct one who knows little or nothing about electricity, photography or X-ray. It is elemental and written in language that any one can understand. The second part of the book is devoted to dental radiography. It gives in detail the special technic involved in the practice of dental radiography. In the second edition the author has written an appendix to each chapter where necessary, giving therein such further consideration of the subject as changes, which have developed in the past few years, seem to demand. Some of the chapters have been entirely rewritten.

A chapter on "The Problem of Pulp-canal Surgery and Oral Infection" has been added and it contains material of importance to the dental and medical professions and the public. 183 radiographic illustrations illuminate the text.

Health by Instruction—An Effort in Favor of a Biologic Teaching. By Louis Subirana, Cirujano-Dentista, Professor of the Dental School of Madrid, Spain. English translation by Frank J. Younger, D.D.S. Sociedad de Artes Graficas, Fuen-carral, 137, 1918.

As indicated by its title, this is a book of instruction and considers the following subjects: Some Preliminary Notions; Ideas Concerning Nutrition; The Mouth and Teeth in the "Medium" and Their Adaptation to Same; The Buccal Function in Nutrition; Its Conclusive Importance; Children's Teeth; The Great Perils of Nutrition; Carries Its Effects on the Intellect and on the Economical Problem; The Great Dangers of Nutrition; Malocclusion; A Question of Culture Rather Than an Economical Problem; Derivations.

A Child's Book of the Teeth. By Harrison Wader Ferguson, D.D.S., illustrated by the author. World Book Company, Yonkers-on-Hudson, New York.

This little book is the first of a series of New World Health Readers for use in the elementary grades. It is filled with information pertaining to the teeth and presented in a manner that will appeal directly to the child and stimulate his interest in caring for his teeth. The illustrations are unique, humorous and impressive, showing much originality in design. It is the best elementary instruction book that we have seen.

THE great highroad of human welfare lies along the old highway of steadfast well-doing; and they who are the most persistent, and work in the truest spirit, will invariablv be the most successful; success treads on the heels of every right effort.—*S. Smiles.*

SOCIETY·ANNOUNCEMENTS

Indiana State Board

The Indiana State Board of Dental Examiners will hold their next examination at the State House, Indianapolis, November 11th to 16th, inclusive, 1918. For application and information write Dr. H. C. McKittrick, Secy., 605 Hume-Mansur Bldg., Indianapolis.

Michigan State Board

The next meeting of the Michigan State Board of Dental Examiners will be held at the dental college, University of Michigan, Ann Arbor, Mich., November 18 to 23, inclusive. Applications and other information may be obtained by addressing B. S. Sutherland, Secy., Owosso, Mich.

Pennsylvania State Board

The next examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Tuesday, Wednesday, Thursday and Friday, December 3, 4, 5 and 6, 1918, at Musical Fund Hall in Philadelphia and the University of Pittsburg, Pittsburg. The practical examination will be held on Friday, December 6th, the last day. Application papers can be secured from the Department of Public Instruction, Harrisburg. For further information address the secretary, Alexander H. Reynolds, 4630 Chester Avenue, Philadelphia.

Annual Meeting of the Dental Protective Association of the United States

The annual meeting of the Dental Protective Association of the United States will be held at the Palmer House, State and Monroe streets, Chicago, on the third Monday of December, the 16th, at 4 P. M., sharp. The report of the officers will be given; a Board of Directors will be elected, and such other business transactions as should come before the Association.

All members are urgently requested to be present.

By order of the Board of Directors.

J. G. Reid, *Pres.*
J. P. Buckley, *Vice-Pres. and Sec'y.*
D. M. Gallie, *Treas.*

Ohio State

The Fifty-third Annual Meeting of the Ohio State Dental Society will be held in Memorial Hall, Columbus, December 3-5, 1918.

The program is as yet incomplete, but announcement may be made of a paper and clinic by Dr. D. A. House, of Indianapolis, on Gold Crowns; Dr. F. M. Wadsworth, of Minneapolis, a paper and clinic on the Articulation of Partial Dentures, and a talk or paper by Dr. A. M. Davis, formerly of Berlin, and others not yet definitely arranged.

A new and interesting feature is a program by the women dentists with Dr. Gillette Hayden in charge. The program of this session will be a Symposium on the Dental Care of Children, with papers by Dr. Kathryn Goette, of Cleveland; Dr. Elberta S. Rosa, of New York; Miss Lillie D. Atkinson, Superintendent of the Children's Hospital of Columbus and a motion picture film, "The Personal Care of the Teeth" prepared for the Michigan State Dental Society by Dr. Grace Rogers Spaulding, of Detroit.

The meeting will be given a military aspect by the expected presence of Maj. C. Victor Vignes, President of the National Dental Association, Col J. H. Snapp, Maj. J. D. Eby, Maj. W. A. Heckard, and others.

On Wednesday evening a complimentary dinner will be tendered Dr. Homer C. Brown in recognition of his services in securing National Dental Legislation.

The Clinics will be complete and comprehensive and we are assured of one of our very best meetings.

Members of other State Societies are cordially invited to meet with us and all persons, members and guests, will present their membership cards at the registration booth where they will receive the necessary badge admitting them to the meeting.

F. R. Chapman, *Secretary.*

305 Schultz Bldg., Columbes, Ohio.

WALK! Every time you "rob" the street car company of a nickel, you add five times that sum to your health. Riding in an automobile is better than traveling in a street car, but walking is better than either.

If you live within a mile or two of your office, walk to and from work. If you live at a longer distance, walk part of the way.

Walking is the finest natural exercise. Outdoor air is the best tonic in the world.

Try it tonight. You may leave your office tired in spirit and body. Walk a mile, and notice how refreshed you are.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

LACONIGRAMS

Oh, you peace-drive! What a lot Heinie the Hun has to learn about diplomacy. One would suppose that his military mistakes were bad enough, fatal enough; but those of statesmanship have been simply crude and childish, playing upon the idea that all the world's a fool except himself.

Do I believe in Dental advertising? Surely. I believe in all professions advertising—advertising the Profession. I do not believe in advertising the individual dentist who does the advertising as a superman in his profession, or as knowing and using certain appliances that nobody but he knows anything about, nor as Painless Perkins, nor anything of the kind that degrades and belittles the profession. Neither do I believe in advertising "Plates, $3.00 Up," and then offering a tray of discards when the patient calls as being the bargains offered, coupled with the statement: "But we can guarantee a fit at $15," or anything like that. I believe in any and all advertising that tells the truth and all of the truth. And I particularly believe in advertising insistently and emphatically the benefits of dental care. I do believe in doing the best I can for humanity; and, incidentally, I do not believe it is good sense or good professionalism for a young man to put in his outfit and then sit around with his tongue hanging out waiting for patients. And, what's more, I believe I know exactly how the kind of advertising that I believe in can be done ethically, unobjectionably, and yet so done that the dentist who does it need not depend solely upon the gratitude of his brothers in the profession for his reward; nor upon happiness in heaven, either! Want to know more about it? Ask me.

At last accounts Busthead Bill still was trying his best to make the world believe that he is all that he thinks he is and then some. Did you read his answer to the President's last note? Did you ever read anything quite so stupidly awkward? Always trying to pass the buck that returns again and again to his edge of the table, and allowing eighth-grade children over here to see just what he is trying to do.

Neutral countries, particularly Denmark, are howling for American dental goods. Of course, it always has been hard to make those fellows pay our prices, but now that they have only the inferior foreign stuff to fall back upon they want the U. S. A. to hurry up and end the war so they can get what they want when they wnat it. There are others.

The Ransom & Randolph Co. is reprinting a very helpful article on Cast Gold Inlays, which will be supplied as soon as ready to all who apply.—Adv.

Dentists had better read carefully the three pages of small type in the body of the literary department concerning the use of platinum, radium and palladium. It may take a little time and patience, but it also may save a little serious trouble. I've given all of mine away, so am not personally concerned!

In twenty minutes, Liberty Loan subscriptions, totalling $20,250,000, were pledged at Metropolitan Opera House, New York. Standard Oil subscribed $2,000,000, Solomon Brothers & Hutzler $1,500,000, Canadian Casualty Co. $1,000,000. An autographed glove, formerly owned and worn by the late Captain Georges Guynemer, famous French ace, was auctioned off for $1,250,000. Joint purchasers were Traveller's Insurance Co., and National Biscuit Co.

Do not sell a grain of your gold scrap for currency. Turn it in to your dealer and demand other gold in exchange for it. In this way your 50% or 75% limit may be eked out considerably, whereas, if the scrap is sold to some irresponsible outsider for money, it has passed out of dental channels permanently.

Dr. D. P. Snyder, instructor in exodontia and conductive anesthesia, Ohio State University, has moved his office from 677 North High to 137 East State, Columbus, where his practice is to be limited to the administration of local and general anesthetics and extraction. Dr. Snyder is one of the busy men, having given some fifteen lectures and clinics on his specialties before different societies.

Drs. Wm. Hemmeyer and F. W. Bischoff, dentists, of German birth, have been convicted of attempting to blow up munition plants at Irvington, N. J., and elsewhere. Bischoff confessed and tried to exonerate Hemmeyer. He was given thirty-five years, and Hemmeyer fifteen years, at hard labor.

We have received a cypy of a new 88-page illustrated catalog of medical, nursing, pharmaceutical, and dental publications issued by The C. V. Mosby Company. Copies will be sent to all who apply.—Adv.

Various colleges are opening courses in dentistry to enlisted men.

The Red Cross is in serious need of dentists. All dentists not in Class 1, and under fifty-five years, are eligible. Here is an opportunity for real service. Inquire of your local Red Cross.

Tennessee dentists have reason to be proud of their war record. Of six hundred and twenty dentists in the state, four hundred and ten are members of the Preparedness League, and nearly twenty thousand operations have been performed for selected men. In addition to the operations performed, many thousands of dollars' worth of materials have been given to the drafted men without charge.

Columbia University is offering this year courses in oral hygiene for women.

The students in the courses are to clean the teeth of the soldiers and sailors sent to the Vanderbilt Clinic by the War Camp Community Service. These young women are dental hygienists. A dental hygienist is licensed by the State Regents to "remove accretions and stains from the exposed surfaces of the teeth, and to teach oral hygiene."

An intensive course of one year theoretical and practical work fits them for this vocation.

A student must have received a minimum of one year high school training before being admitted to the courses. The present enrolment includes many wives of dentists, college graduates, trained nurses and dentists' assistants.

Students are required to register at the office of the assistant registrar, College of Physicians and Surgeons, 437 West Fifty-ninth Street.

DEATHS

At Hagerstown, Md., October 4, of pneumonia, Dr. H. Norton Porter, aged 36.

At Camp Tobyhanna, Pa., October 2, of Spanish Influenza, Lieut. Dr. John Simons, a graduate of Minnesota class of 1916, aged 25.

At Pittsburg, Pa., October 2, Dr. Grant Mitchell, aged 54.

At Pittsburg, September 5, Dr. A. D. MacDonald, aged about 50.

At Lafayette, Ind., September 23, Dr. Jacob Warren, aged 84. Dr. Warren was one of the oldest dentists in the state. He had been president of the state society several terms.

At Baltimore, Md., September 21, Dr. J. Emory Scott, aged about 75. He had practiced in Baltimore over 50 years.

At Brooklyn, N. Y., October 2, Dr. Owen Edward Houghton, aged 69. Dr. Houghton was prominent in society and sports circles of his city and state, a Son of the American Revolution, and many other societies.

At Camp Dix, N. Y., September 27, of influenza, Lieut. Dr. Frederick Ballackey, aged 41.

At Boston, October 4, of influenza, Lieut. Dr. Wm. C. Niles, of Newton, Mass., an instructor in the training school of the Department of the Northeast.

Erratum

Through a typographical error in October issue, page 799, the author's name appears as "Grosley" when it should be "Grosby."

Meeting Not Held

The meeting of the Northern Indiana Dental Society to have been held in October was "called off" on account of "Spanish Flu." The next meeting will be held in Muncie, Indiana, October, 1919.

Indiana—First District

Evansville, Ind., Oct. 3.—Round table clinics were featured during the first part of the afternoon session of the sixth annual meeting of the First District Dental Society. Discussions were in charge of Carl D. Lucas, Indianapolis; M. M. House, Indianapolis; J. B. Carr, Indianapolis; W. G. Downs, Evansville; E. L. Snethen, Evansville; H. D. Caton, Terre Haute; Victor Jordan, Evansville; L. F. Smith, Indianapolis; S. Edith Davis, Indianapolis.

Lieut. Curtis, of Camp Taylor, Ky., who occupied the place on the program of Major Wm. Mann of the officers' camp of dental surgeons, gave an address on "Army Dentistry," Tuesday evening.

J. A. Brumfield was the presiding officer of the morning session which was given over to business. Reports of committees were given by J. A. Brumfield; G. J. Smith, of Rockport; I. L. Faith, of Evansville; N. N. Williams, of Mt. Vernon; F. W. Taylor, of Boonville; A. J. Kimm, of Evansville; W. G. Downs, of Evansville; and W. B. Ridgeway, of Vincennes.

At noon the trustees met, the following being present: J. A. Brumfield, A. J. Kimm, A. R. Ficken, W. C. Beren, G. J. Smith, William Bogie and George Franke.

During the afternoon, small clinics were held, with the discussions in charge of A. R. Rietz, A. R. Ficken, I. L. Faith, William V. Keil, C. W. Brumfield, N. E. Kuehn, C. J. Hawkins, J. O. Zubrod, Harold Downing, and J. M. Hale.

Among those who registered were J. M. Hale, of Mt. Vernon; J. M. Brimberg, W. C. Boren, and W. T. Dorsey, of Princeton; J. D. Emerson, and F. W. Montgomery, of Owensville; Thomas L. Posey, St. George Craig, L. A. King, and W. K. Markwell, of Henderson; William Bobie, of Vincennes; E. Dillon, of Winslow; G. J. Smith, and S. A. Bosler, of Rockport; Howard Caton of Terre Haute; D. T. Tilford, C. C. Ferguson, and H. E. Cottingham, of Morganfield; F. W. Traylor, of Boonville, and H. Peer, of McLeansboro, Ill.

Dr. A. R. Reitz, of this city was elected president.

Dr. William Bogie, of Vincennes was made vice-president, and Dr. A. R. Kimm, of Evansville, secretary-treasurer.

Dr. Victor Knapp, of the local body was elected trustee of the state society for one year, to represent the local dentists at the meeting of state officers and board of trustees in Muncie.

Dr. Ficken, also of Evansville, was made a state trustee of the dental association, for the period of three years.

Other appointments were as follows:

Ad interim—Drs. A. J. Kimm, J. O. Zubrod, V. K. Knapp, and C. J. Hawkins, all of Evansville.

Resolution committee—Drs. Ficken, Snethen and Zubrod.

Superintendent of clinics—Dr. C. J. Hawkins.

Master of exhibits—Dr. J. E. Walker.

Board of censors—Dr. D. W. Montgomery, Owensville; Dr. Snethen, and Dr. Hawkins, of Evansville.

Necrology—Dr. E. Q. McElhaney, Mt. Vernon; Dr. J. W. McKenney, Boonville; and Dr. S. F. Bosler, Rockport.

Membership—Dr. W. J. Hooker, Newburg; Dr. Roy Smiley, Washington; and Dr. Frank P. Bethel, Petersburg.

Oral Hygiene—Dr. O. E. Head, Winslow; Dr. V. W. S. Trippett, Princeton; and Dr. R. C. Day, Vincennes.

Legislation—Drs. A. J. Kimm, J. O. Zubrod, and V. H. Knapp.

Press—Dr. J. E. Walker, and Dr. A. J. Kimm.

The only woman dentist present at the convention was Dr. S. Edith Davis, of Indianapolis. Dr. Davis, who is young and attractive, gave a talk yesterday afternoon on "prophylaxis."

The morning session yesterday was held at the Princess theater with papers by Carl D. Lucas, of Indianapolis, and F. W. Rounds, of Louisville. Following the lectures an automobile ride of the city was enjoyed by the one hundred visiting delegates.

Dr. J. A. Brumfield, former president of the First District Dental Society, left Tuesday evening for Chicago, where he will take up a course of work, preparatory to a Y. M. C. A. secretaryship in France.

Baylor college, Dallas, Texas, is installing a Pasteur institute.

Hall Dental Supply Co., Chicago, has gone out of business.

X RAY

A complete course of private instruction in DENTAL ROENTGENOLOGY is offered. Special attention to technic. Address

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452-454-456 Rose Building **CLEVELAND, OHIO**

In the treatment of suppurative lesions of the gums, wherein stimulating restorative antiseptic influence is indicated, prescribe

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For cleansing and purifying the oral cavity before and after operations on the teeth, a cooling, refreshing spray, wash or gargle is provided by

LISTERINE

As an adjunct to the dental toilet of your patients; as a prophylactic tooth and mouth wash, for daily use, there is nothing superior to

LISTERINE

Booklet "The Teeth and Their Care" emphasizes the importance of frequent consultation with the dentist, and contains useful information for patients; 200 copies, imprinted with professional card, furnished gratuitously.

Dental Examination Blank combining chart and Notice to Parents, suitable for dentists doing clinical work among school children, also supplied without cost. Dentist's name and address printed thereon.

Lambert Pharmacal Company

Twenty-first and Locust Streets **St. Louis, Mo., U. S. A.**

Dental Students' Army Training Corps

The dental colleges of the country must supply a defficiency of 4,000 men as soon as they can be prepared and graduated. For this reason the government has taken over the dental colleges of the country which have been able to attain standards of class A or Class B, and students entering those institutions who can pass the physical examination will be enrolled as members of the Students' Army Training Corps, their tuition being paid by the government, which also provides their uniform and subsistence and pays them the salary of a private in the army during their period of instruction.

Students who fail to pass the physical examination can continue their studies as civilians, but at their own expense. Boys under eighteen who enter the dental colleges must also attend as civilians until they reach the military age, when they will be inducted into the S. A. T. C. if they possess the physical qualifications. Upon graduation these dental surgeons will be commissioned in the medical branch of the army.

The classification, as announced by the executive committee of the Dental Educational Council, of which Dr. Henry L. Banzhaf, of Milwaukee, is secretary, is as follows:

CLASS A

University of Southern California, college of dentistry, Los Angeles.
University of California, college of dentistry, San Francisco.
Northwestern University Dental School, Chicago.
University of Illinois, college of dentistry, Chicago.
University of Iowa, college of dentistry, Iowa City, Iowa.
University of Michigan, college of dentistry, Ann Arbor, Mich.
University of Minnesota, college of dentistry, Minneapolis, Minn.
Creighton University, college of dentistry, Omaha, Neb.
Ohio State University, college of dentistry, Columbus, O.
North Pacific Dental College, Portland, Ore.
University of Pittsburgh, college of dentistry, Pittsburgh, Pa.
Thomas W. Evans Museum and Dental Institute, University of Pennsylvania, Philadelphia.
Medical College of Virginia, school of dentistry, Richmond, Va.
Marquette University, college of dentistry, Milwaukee, Wis.
Harvard Dental School, Boston, Mass.

CLASS B

Colorado College of Dental Surgery, Denver, Colo.
Georgetown University of Dentistry, Washington, D. C.
Howard University, dental school, Washington, D. C.
Atlanta-Southern Dental School, Atlanta Ga.
Louisville University, college of dentistry, Louisville, Ky.
Chicago College of Dental Surgery, Chicago.
Indiana Dental College, Indianapolis, Ind.
Loyala University, school of dentistry, New Orleans, La.
Tulane University, school of dentistry, New Orleans, La.
Baltimore College of Dental Surgery, Baltimore, Md.
University of Maryland, dental department, Baltimore, Md.
St. Louis University, college of dentistry, St. Louis, Mo.
Washington University Dental School, St. Louis, Mo.
Kansas City Dental College, Kansas City, Mo.
Western Dental College, Kansas City, Mo.
University of Buffalo, dental department, Buffalo, N. Y.
New York College of Dentistry, New York.
College of Dental and Oral Surgery, New York.
Western Reserve University, dental school, Cleveland, O.
Ohio College of Dental Surgery, Cincinnati, O.
Philadelphia Dental College, Philadelphia, Pa.
Vanderbilt University, school of dentistry, Nashville, Tenn.
University of Tennessee, college of dentistry, Memphis, Tenn.
Meharry Dental College, Nashville, Tenn.
George Washington University Dental School, Washington, D. C.
College of Physicians and Surgeons, dental department, San Francisco, Cal.
Baylor University, dental department, Dallas, Tex.

CLASS C

Lincoln Dental College, Lincoln, Neb.
College of Jersey City, N. J.
Cincinnati College of Dental Surgery, Cincinnati, O.
Texas Dental College, Houston, Tex.

Under the act of congress providing for the Students' Army Training Corps, young men studying dentistry as well as medical students, in duly accredited institutions are enlisted as privates in the army, provided with uniform and subsistence and are paid the salary received by private soldiers in the army, during their period of instruction. They are held as a dental reserve, and except in case of unusual need they will be permitted to continue their studies until graduation, after which they take their places in the medical department of the army. The United States government has profited by mistakes of the allies who permitted their medical and dental professions to be almost fatally depleted in the first years of war through neglect to provide for a reserve force.

"The classification of dental schools, which had never been made before, was directed by the military authorities of the government," said Dr. Banzhaf, dean of Marquette University College of Dentistry, who is secretary of the Dental Educational Council of America.

"It is of great importance that young men interested in the study of dentistry be advised of the institutions recognized by the government as if they are students at other dental colleges they will be liable to interruption of their studies at any time and will be treated as any other men eligible to army service under the selective service act."

Keep your eyes and ears open for information that may lead to the arrest and conviction of hunnish spies; and be sure that you have "the goods on them" before you make any report. This is not Germany; and only definite information will avail to convict. Mere report and rumor will lead to expense and loss of time only. Be ready to make affidavit to anything you have to report.

Most of us don't need new ideas as much as we need doers to help us carry out some of the old ones.

Classified Advertisements under this heading, $2.00 each for 60 words or less: additional space, 2 cents per word, single insertion; three insertions or more, special rate on application.

WANTED—LABORATORY MAN FOR PLATE DEPARTMENT. MUST BE CAPABLE OF TURNING OUT FIRST-CLASS PLATES IN EVERY RESPECT. MUST NOT BE SUBJECT TO PRESENT DRAFT. STATE SALARY, EXPERIENCE AND REFERENCES IN FIRST LETTER. NOA SPEARS CO., SAN ANTONIO, TEXAS. 1110C

REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XXXVIII December, 1918 No. 12

INTERPRETATION OF DENTAL RADIOGRAMS*

BY GEORGE F. THOMAS, M.D., CLEVELAND, OHIO

IT WAS with a feeling of the gravest apprehension that I accepted the kind invitation of your chairman to present to this meeting a few remarks on the interpretation of dental X-ray films. This feeling was changed to one of dire dismay when I took inventory of all the data which I could mobilize. I realized then that your chairman was accessory to the fact that this field was one in which it might truthfully be said that X-ray men rush in where dentists fear to tread.

In the first place the subject obviously divides itself into two parts: *First*, the consideration of those basic facts and typical Roentgenographic appearances that everybody understands, and *second*, the consideration of those factors that nobody understands. But, lest we make too extensive a confession, we must not formally classify our remarks under these two headings. Besides, one is uncertain at just what point the pathognomonic characteristics leave off and the process of eliminative deduction begins This situation is unavoidable, and no apologies are needed. Nature herself does not make sharp distinctions between the pathological and the physiological. In the process of inflammation, Degeneration and Regeneration go hand in hand, and the most careful microscopic scrutiny will not reveal any sharp boundary where the zone of repair is demarcated from the zone of destruction. Nor from the standpoint of time is nature abrupt. An area of bone destruction does not appear simultaneously with the entrance of infection, nor does bone

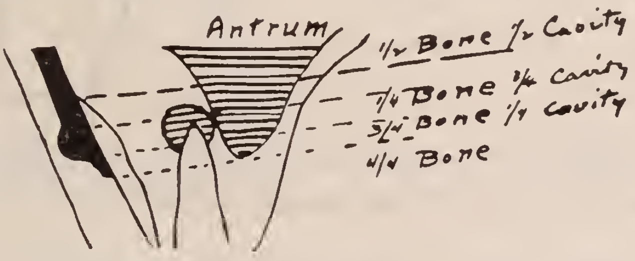

Fig. 1—Shows diagrammatic representation of density resulting from superimposition of abscess on antrum shadow.

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*Presented at the Northern Ohio Dental Society, Toledo, June, 1918.

regain its normal structure immediately at that moment when nature has secured the mastery of the invading bacteria. Other facts also must be borne in mind. Nature has no distinctive type or degree of reaction as far as we know to any given organism. The protective vigor of the tissue is matched against the amount and virulence of the specific infection, and the resultant pathological changes are dependent entirely on the comparative strength of these two factors. It is true to a certain extent that in a few instances, the type of reaction is somewhat characteristic, for instance, the predominating tendency in a tuberculous osteitis is toward osteoporosis or rarefying osteitis, whereas in syphilitic involvement, osteosclerosis or condensing osteitis is apt to be the more marked feature. But even in these infections, both types of changes take place and simultaneously.

In view of these various factors, it is evident that we cannot rely entirely for all our diagnostic data on the X-ray film alone, for it is merely a macroscopic record of the structure and the density of the tissues, rather indeed it is a composite of all the superimposed shadows of the infinite number of layers of which the tissues are composed. In interpretation the thickness of the bone and the overlying soft tissues as well as their relative densities must be considered.

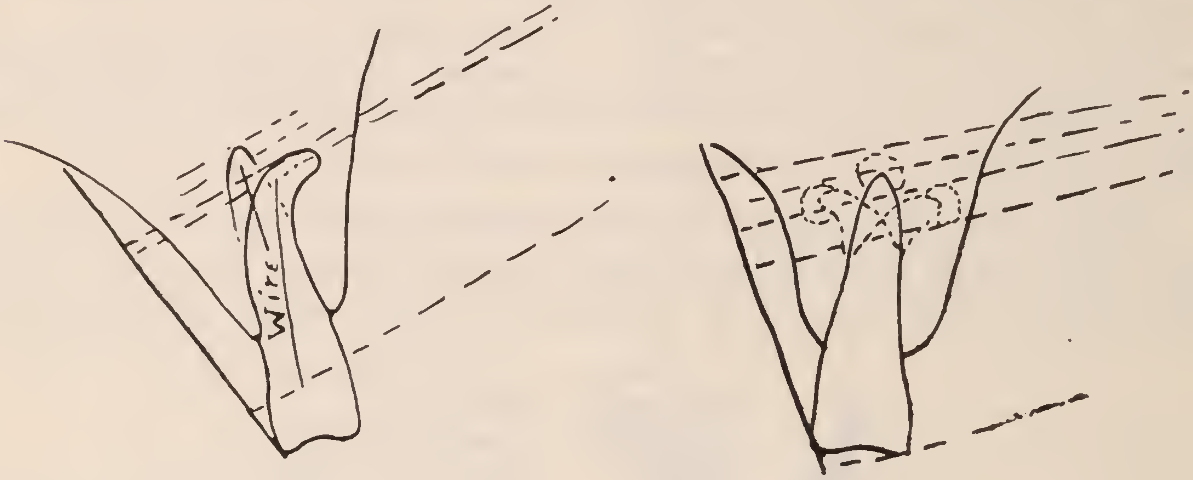


Fig. 2

Fig. 2A

Figs. 2 and 2A—Show curvature of root results in distortion of shadow, lengthening or foreshortening.

And all that we can do in the interpretation of such a record is to observe the variations from the usual or normal appearance and then draw our conclusion that certain pathological changes have taken place, having in mind all the time the possibilities of error and the fact that the most obvious interpretation may be a misinterpretation. And this conclusion is not necessarily the diagnosis. It, in turn, must be considered in correlation with the clinical history and the data obtained by the usual methods of examination. This statement is of course axiomatic, but nevertheless in actual practice, its application is often lost sight of because it is such a simple procedure to make an X-ray film and the film seems so ready as a rule to furnish in full the desired data.

The first requisite to a good interpretation is of course a good film or better still two or more good films of the same region taken from different angles. The value of films from different angles is readily demonstrated by a few illustrations.

An unusual curvature of the root may result in the superimposition of the shadow of the end of the root over an area of absorption, or shadows for instance of the anterior palatine foramina may be so cast upon the apices of the upper central incisors as to simulate the appearance of an abscess. The same is true of the inferior dental foramen. The presence of some local thickening of the jaw may neutralize the shadow of an area of absorption. The same result may occur if the central ray passes obliquely through the area of absorption, superimposing on it a greater thickness of healthy bone than normal.

An abscess may appear to involve the apices of two or three adjoining teeth, whereas in reality only one is involved as may be demonstrated by films made from different angles. There are numberless other instances where multiple films of the same region are of distinctive value.

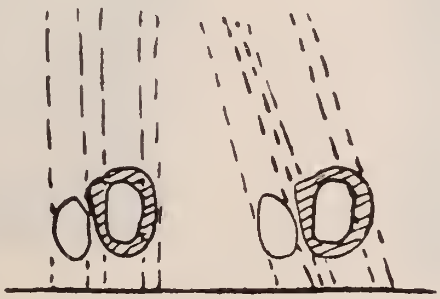


Fig. 3

Fig. 3—Shows how shadows of two separate bodies may be superimposed so as to appear continuous. Films from different angles will correct this illusion.

The delineation of separate roots or root canals; the demonstration of double root canals; the separation of the shadow of the apices of a bicuspid or molar from the overlying antral shadow, and the location of an unerupted tooth are familiar examples. It also is evident of course that a fracture of a root may be overlooked unless the plane of the central ray luckily happens to be in the line of fracture. If the fracture extends mesio-distally, it may be quite impossible to demonstrate it radiographically. Stereoscopic films frequently help in the interpretation of many of the above conditions. They increase our faculty for observation of detail and enable one to separate the various shadows into their respective planes. I recall one case in which the stereoscopic films called attention to a collection of pulp nodules, not readily apparent on the single film.

The essentials in a good film are good contrast of tissue densities, sharp definition of bone structure and minimum distortion. It is of course practically impossible to eliminate a relative amount of distortion. The axes of adjoining teeth may lie in different planes and the same is true of the buccal and lingual roots.

In fact, there usually is relative foreshortening of the buccal roots and lengthening of the lingual or vice versa, even when the film is made at the proper angle, in which of course, the central ray is at right angles to a plane midway between that of the film and that of the tooth. The amount of distortion approximately may be estimated, when occasion demands, by making radiographs after inserting a piece of wire of known length into the root canal. The ratio between the length of the shadow of the wire and its actual length is the same as that between the length of the shadow of the root and its actual length, excepting for a possible irregular curvature in the end of the root beyond the point to which the wire was inserted. (*See Fig. 2.*)

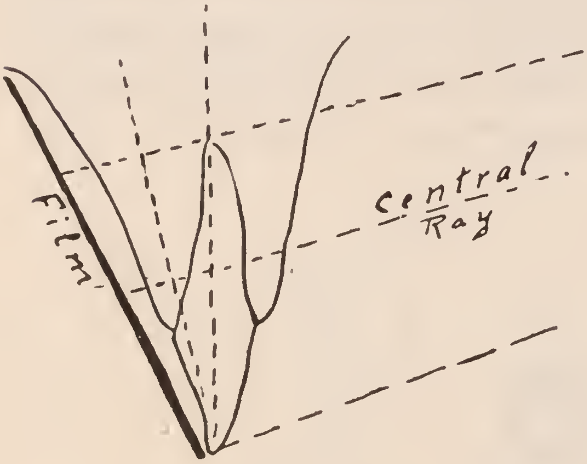


Fig. 4

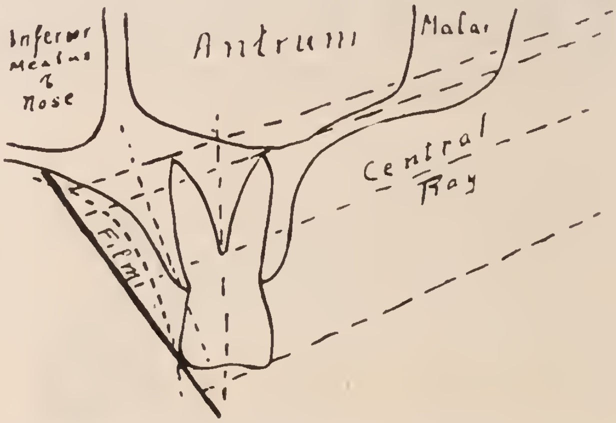


Fig. 4A

Fig. 4—Correct angle necessary to eliminate distortion.
Fig. 4A shows unavoidable relative foreshortening and lengthening of lingual and buccal roots, especially exaggerated if film is curled to fit into mouth. Shows how the shadow of the malar bone and antrum are superimposed on the apex.

The tooth is the densest tissue in the body. Its various structures however have enough difference in density to show up on a radiograph, so that we can make out the enamel, the dentin, the pulp cavity and the root canals. Small cavities can be detected. Occasionally a carious process can be discovered within an apparently sound tooth. Surrounding the tooth is the thin, dark line representing the transparent peridental membrane. Then comes the thin white line produced by the compact bony lining of the alveolus, which layer of bone I understand is variously designated as the lamina dura, or the cribriform plate of the alveolus. This white line normally can be traced completely surrounding the outline of the root, except in children however, where the apex of the tooth is not completely formed.

The inner border of this white line is relatively smooth. Its outer border merges into the surrounding cancellous structure of the jaw. Its continuity is of the greatest value in interpretation because of the fact that its absorption at the apex is one of the first indications of apical infection. In other words, its presence eliminates the consideration of all but the earlier stages of inflammation.

An infectious process in bone tissue primarily results in absorption of the lime salts, reducing locally the density of the tissue. (*Fig 6.*) The first stage of infection accordingly is indicated on the film by an abnormally dark area, even though the zone of osteoporosis is rather small in proportion to the thickness of the overlying normal tissue. With the increase in this proportion, and the destruction of the bone lamellæ, the characteristic cancellous structure of the bone becomes progressively more indistinct. If a fistula forms through the external alveolar plate, the shadow will be quite black. The development of these various stages in the progress of the inflammatory reaction is of course gradual, the X-ray film showing the end results. So there is a period of time following the inception of the infection in which the X-ray film does not show any discernible variation from the normal. This is a very unfortunate circumstance, because of the fact that it is during this stage of infection that the patient often suffers the severest pain, which may be so intense that it cannot be localized either subjectively or objectively. How long a period elapses after infection before sufficient decalcification has taken place to show up on an X-ray film is indefinite. It must vary according to the nature and virulence of the infection. Opportunities for accurate observation are of course limited, but impressions obtained from personal observations indicate a period from one to several days. During this period a very intense inflammatory reaction with hyperæmia and exudation may be taking place without sufficient variation from the normal density to be demonstrated radiographically.

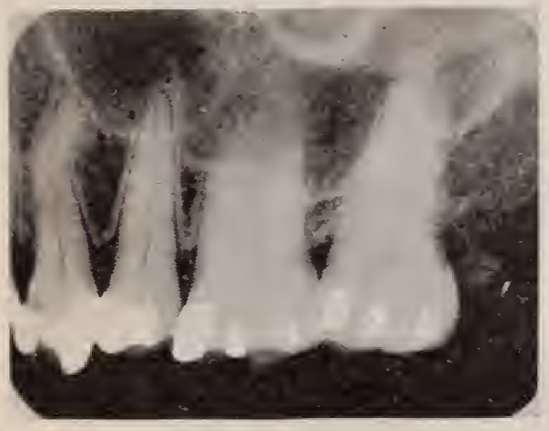


Fig. 5

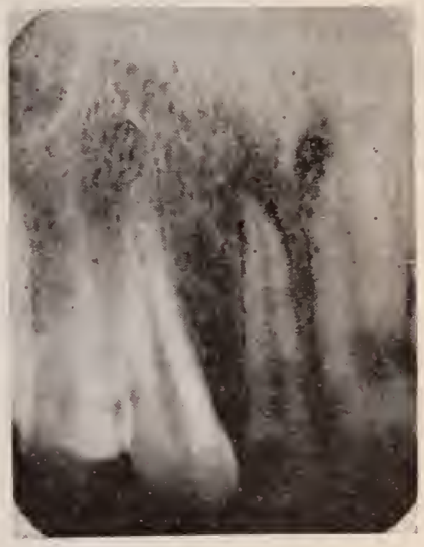


Fig. 6

Fig. 5—Shows bicuspid and molar regions. Shadow of malar and zygomatic process at top. Antrum with clear distinct white border with septum; white alveolar line about apex of bicuspids showing through superimposed antrum shadow; and condyle of jaw at lower edge of film.

Fig. 6—Early focus of infection with absorption of white alveolar border.

In addition to the phenomenon of osteoporosis, we sometimes find its opposite, a tendency to sclerosis associated in that complex combination of phenomena that constitutes inflammation. A question therefore naturally arises as to the nature of this new bone formation. Is it a reparative process, representing effort on the part of nature to wall off the zone of infection? Or is it merely a passive hyperactivity on the part of the osteoblastic elements incited by the irritation and in the presence of the invading bacteria? Can the re-formation of the Haversian lamellæ and the redeposit of lime salts take place before nature has overcome the activity of the infection or at least achieved local immunity against it?

This leads up to the question, May we assume that an area that shows up on an X-ray film as having regained its normal density and structure is entirely healed and free from active infection, and may we further assume that areas of osteosclerosis developing adjacent to or subsequently in the site of an area of absorption are likewise sterile and not the possible source of secondary infection? We know, of course, that in syphilis the predominating tendency is new bone formation and osteosclerosis. But even here we find areas of bone absorption. Furthermore in pyogenic infections the primary change observed is osteoporosis. The sclerosis is secondary. A zone of sclerosis may surround an area of absorption but I never have observed a zone of absorption surrounding an area of sclerosis, except where the sclerotic bone is definitely a sequestrum.

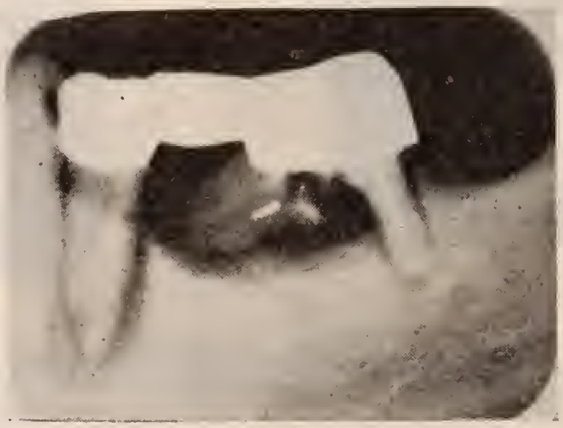


Fig. 7

Fig. 7—Marked osteosclerosis consequent to chronic inflammation.

It seems to follow that osteosclerosis is a defensive and reparative action on the part of nature and that the redeposit of lime salts in an area where the bone had been absorbed is evidence of victory. (*Fig. 7.*) It may be that in an exceptional case, latent foci of infection may be encysted within the new bone formation to light up again during some subsequent period of lowered resistance or possibly to be transported to some more favorable environment, where, with renewed virulence, they may set up serious secondary disturbances. This possibility must be considered and in an occasional case may explain obscure symptoms. But as a general rule, the formation of new bone tissue and redeposit of lime salts indicate the healing of the infectious process. The re-formation may restore the bone to practically normal appearance or it may be excessive and produce quite an opaque area of bone. In the light of our present knowledge, this is of no apparent significance other than to indicate that nature is not always efficiently conservative in her physiological reactions. Eventually, however, there appears to be a tendency to reabsorb useless tissue. This economy on the part of nature is quite noticeable in her treatment of the new bone formation following fractures, which is essentially an inflammatory reaction.

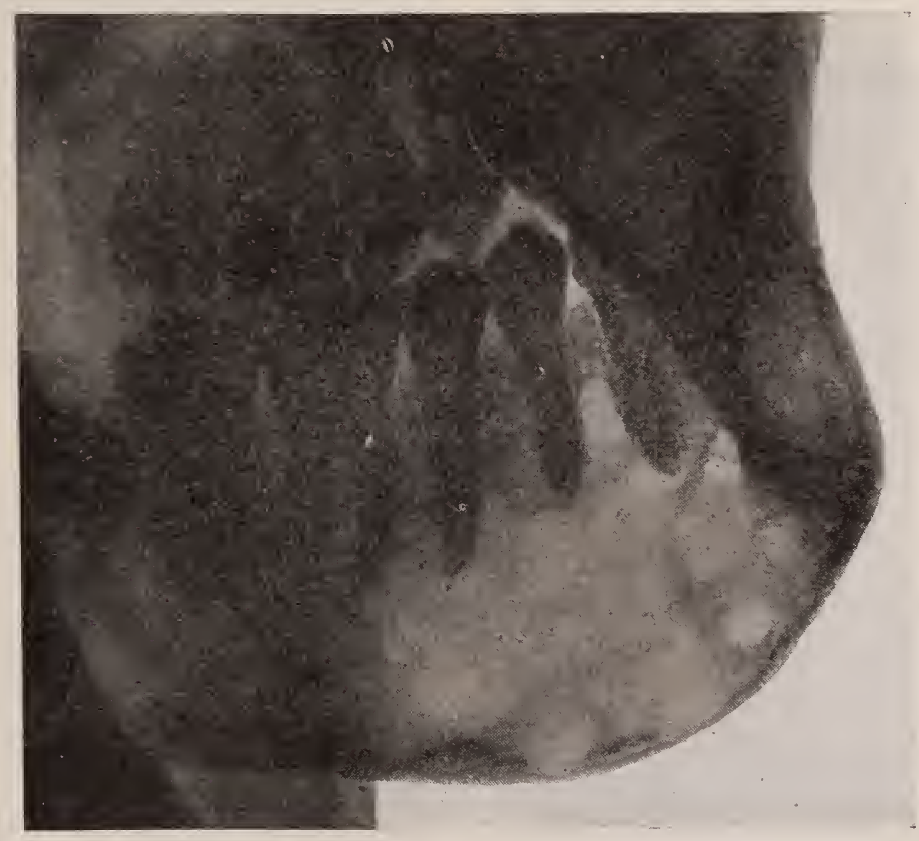


Fig. 8. Cyst of body of inferior maxilla

However, although these considerations of the healing of bone and the conclusions that may be drawn from the demonstration of new bone formation on the X-ray films are of considerable interest, they are of less frequent clinical importance than the question of what significance we may attach to the presence of an area of absorption, i. e. does the persistence of the osteoporosis necessarily indicate at least a potentially active focus of infection. In view of the serious secondary disturbance that may arise from such lesions either by metastasis or process of absorption on the one hand, and on the other the urgent desirability of conserving all the teeth not inherent sources of infection, the fundamental importance of this question is obvious. As far as I know, no definite answer to the general question is at present available. Considerable research and a long series of clinical observations eventually will solve it, but in the meantime, we must be guided by our present conclusions, i. e. the burden of doubt is placed on the area of osteoporosis; we must consider it a possible source of infection until proven otherwise; whatever evidence we have is against allowing it to remain undisturbed. It is a rare occurrence for a bone abscess to heal spontaneously. Whether because of its compact nature, or some other reason, bone seems to lack the same facilities for resolution that characterize soft tissues.

Even when the progress of the infection has been arrested and the process assumes a dormant stage without local symptoms, the probabilities are that the mass of granulation tissue that replaces the broken down bone lamellæ, still contains active infectious material. The lesion may become walled off by a pyogenic membrane, and the contents may become sterile, but except in rare instances, the X-ray film gives no indications to suggest the benign character of the focus.

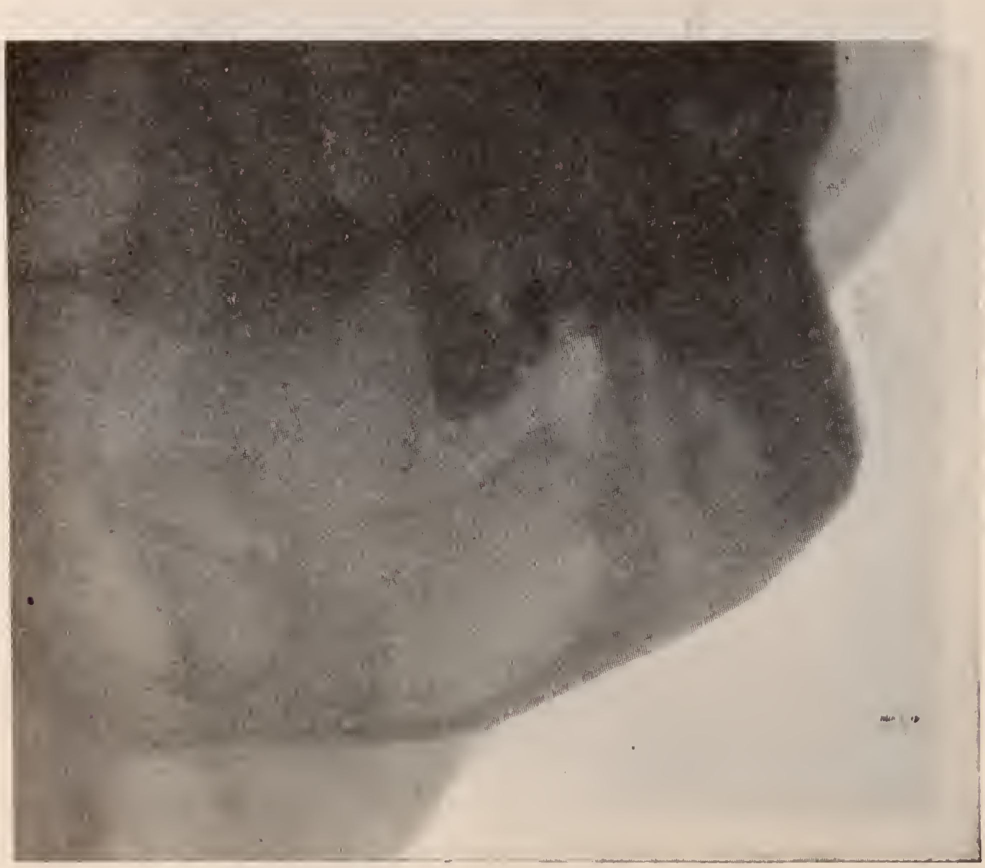


Fig. 9. Large cysts of inferior maxilla

The bone changes in pyorrhea alveolaris are of course clearly demonstrated on the radiograph. The extent of the destruction of the alveolar process is ascertainable at a glance. When absorption takes place along the sides of the root, the white line of the lamina dura is obliterated and a broad zone of osteoporosis indicates the area of involvement.

Bone cysts usually are characterized by a smooth white border, which demarcates the area of marked bone absorption from the sur-

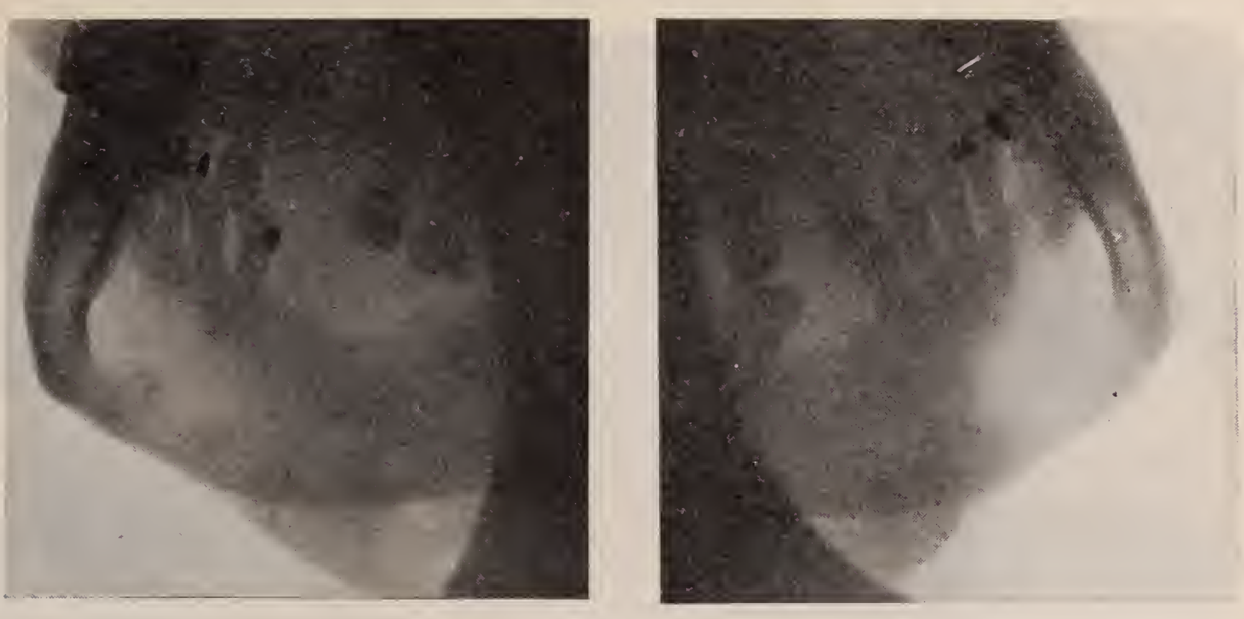


Fig. 10. Large cyst involving both sides of inferior maxilla

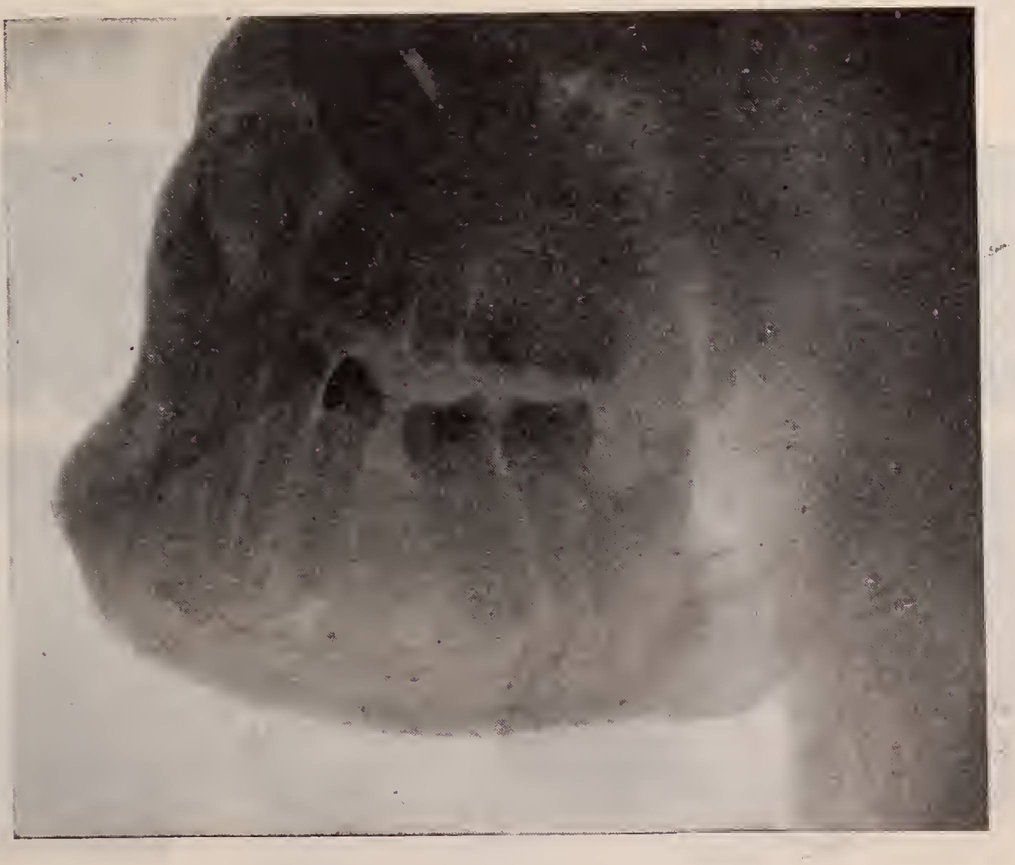


Fig. 11. Cyst in ramus of inferior maxilla

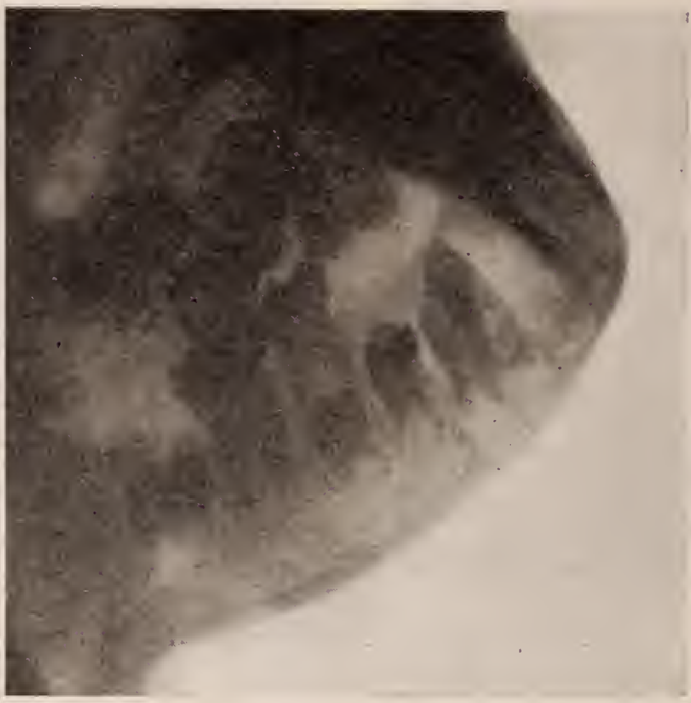


Fig. 12. Dentigerous cyst in cuspid region of inferior maxilla

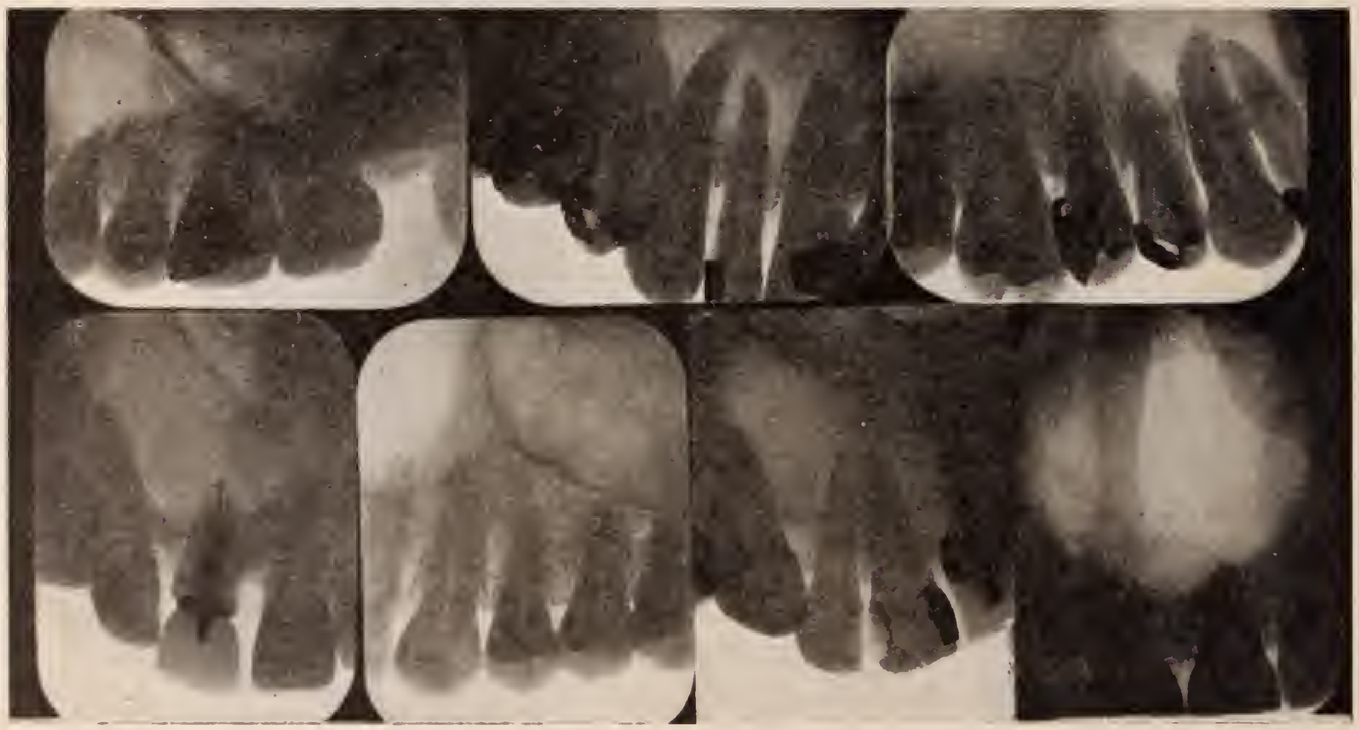
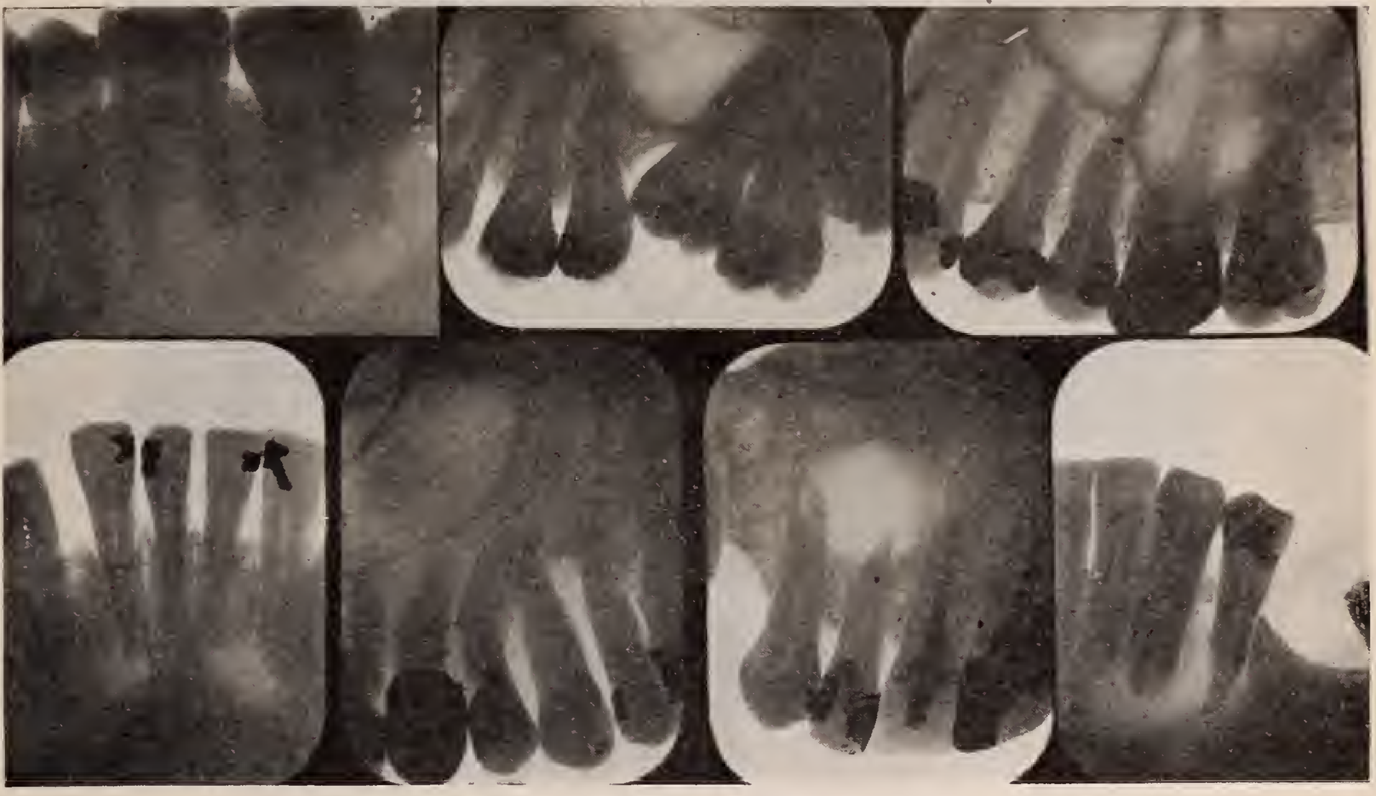


Fig. 13. Cysts in upper jaw. Note difference in appearance of cyst wall from wall of antrum



Dentigerous cyst from unerupted third molar

Angulation of molar against bicuspid

Normal apical shadow showing through antral shadow

Abscesses

Pyorrhoeal Absorption

Cyst from old abscess

Old abscess with absorption of apex

Fig. 14

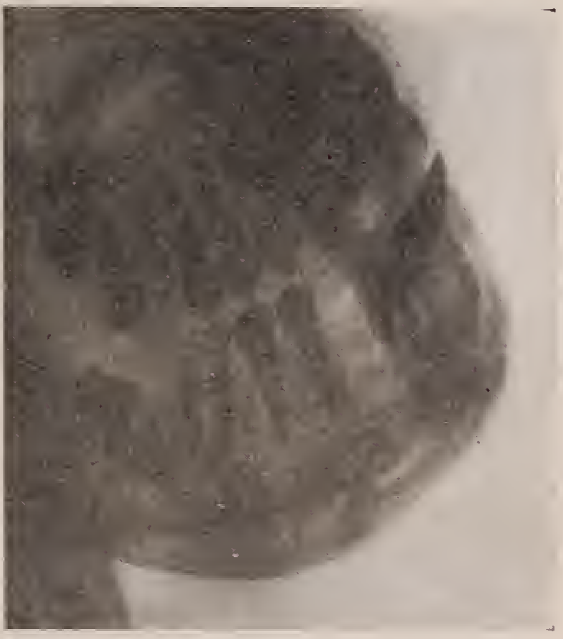


Fig. 15. Osteomyelitis of inferior maxilla

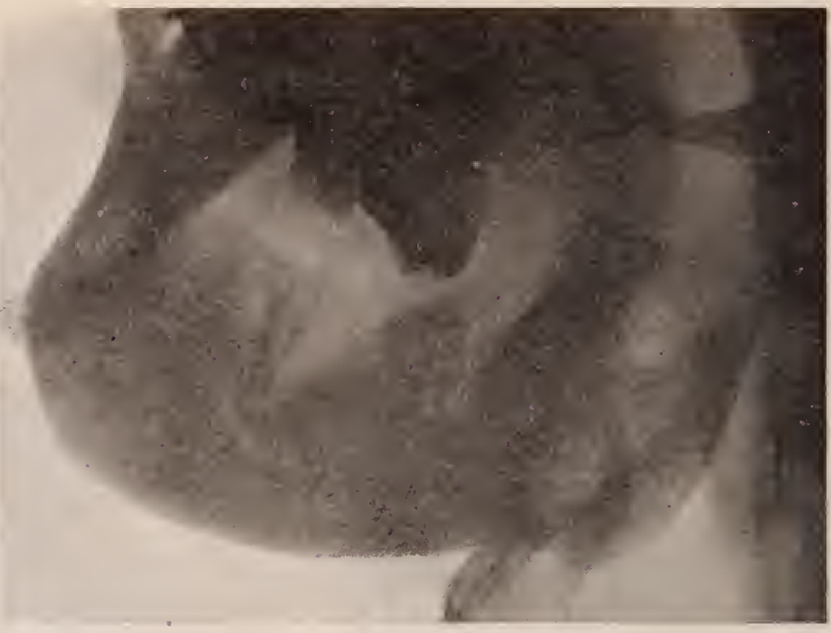


Fig. 16. Osteomyelitis arising from old broken-off roots, which had been buried by the gum and remained quiescent for many years

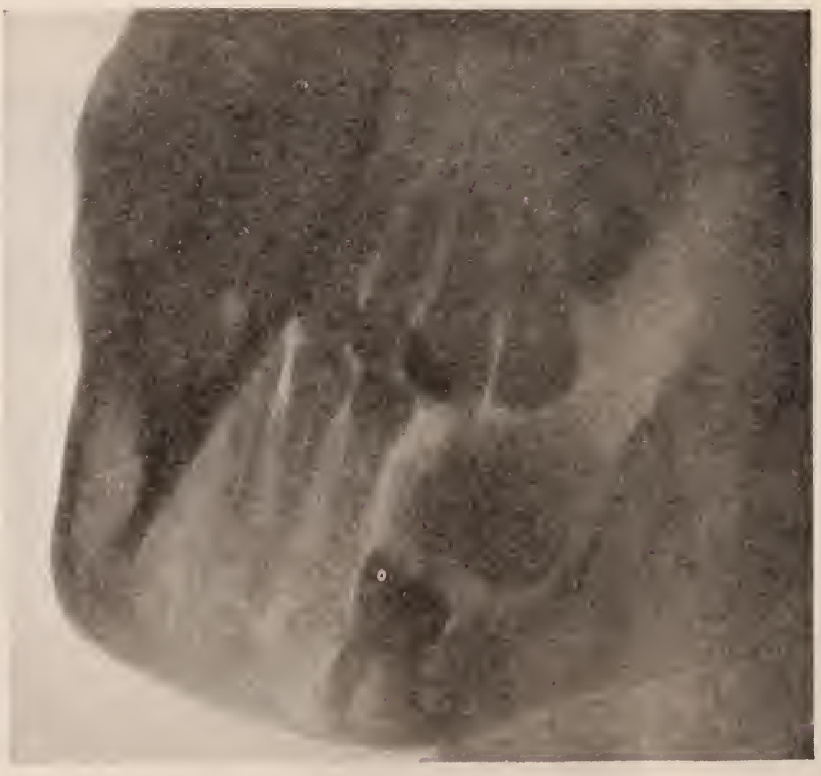


Fig. 17. Odontoma

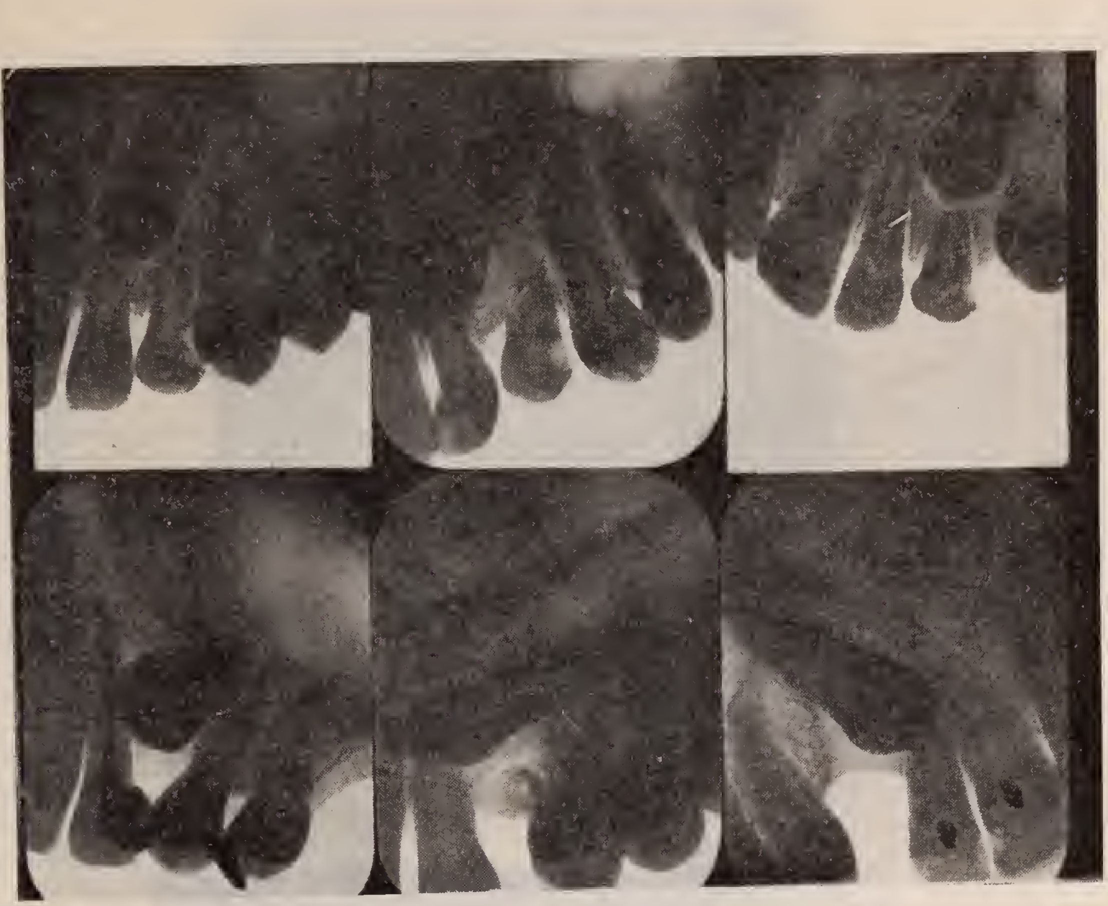


Fig. 18. Unerupted teeth

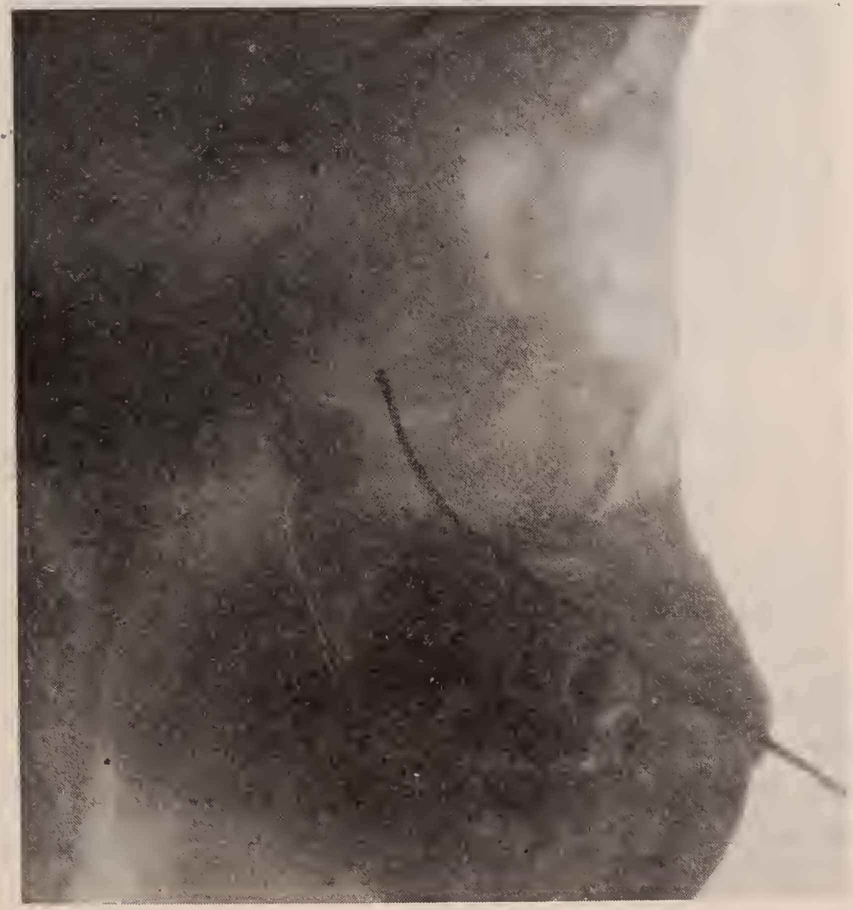


Fig. 19. Unerupted molar in posterior wall of antrum

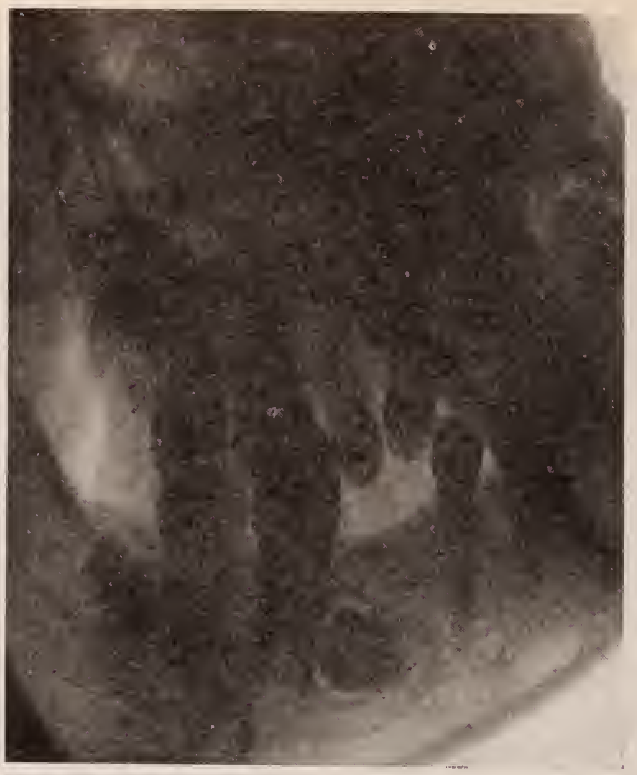


Fig. 20. Impacted lower bicuspid

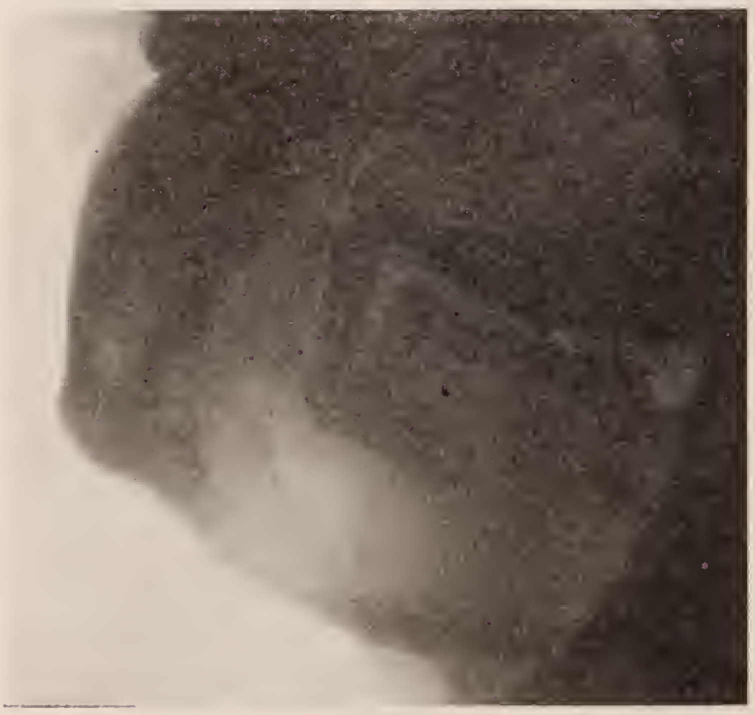


Fig. 21. Sarcoma of inferior maxilla

rounding normal cancellous bone structure. This border is similar to that of the antrum. (*Figs. 8, 9, 10, 11, 12, 13, 14.*)

When an unerupted tooth is found in connection with the lesion the nature of the cyst is evident.

When the cyst is infected the white border may be absorbed and resemble an ordinary abscess or a sarcoma. The history may help in the differential diagnosis.

Furthermore bone cysts are apt to enlarge without breaking through the cortex, though distending it to a very marked degree, whereas a sarcoma is more apt to break through the outer shell of bone, and involve the soft tissues at a relatively early stage. Osteomyelitis of the jaw is characterized by areas of absorption, areas of sclerosis and periosteal—new bone formation, the predominance of these various characteristics depending on the stage of the process and the relative degree of reaction. (*Figs. 15 and 16.*) Some other interesting conditions will be seen in *Figs. 17, 18, 19, 20, 21.*

The limitations of radiography as a means of diagnosing dental lesions are of course familiar to all who have used it. Some of the early stages of inflammation will not show up; one may not be able to state whether a certain area is an active focus of infection or whether another is healed to nature's satisfaction; but nevertheless in spite of these limitations, radiography is a valuable addition to the diagnostic armamentarium of the dental profession. In the illumination of those hidden foci of disease, unsuspected and undemonstrable by other methods, Roentgenology has a proud achievement which, indeed, may be included as one of its most beneficial contributions to medical science.

1021 Prospect Avenue.

THE DENTAL SUMMARY

THE DENTAL SUMMARY for 1919 will be filled with the best material obtainable. No dentist can afford to be without it. Any one number will be worth more than the entire year's subscription price.

The January number will, aside from other interesting material, contain the following contributions:

Technic of Root Preparation and Porcelain Jacket Crown Construction, 17 illustrations, by DR. GEORGE A. THOMPSON, Chicago.

Chronic Diseases of the Mouth of Interest to the Dentist, 13 illustrations, by DR. KEVET H. THOMA, Boston.

Suppurative Gingivitis with Alveolar Involvement, 10 illustrations, by DR. ARTHUR ZENTLER, New York City.

Microscopic Studies of Diseased Peridental Tissues, 4 illustrations, by DR. E. H. HATTON, Chicago.

The Etiology of Dental Caries and Other Findings, by DR. D. M. CATTELL, Memphis.

Ideas of Properly Handling Children in the Dental Office, by DR. L. J. MCRAE, Memphis.

Preventive Dentistry, by DR. D. P. HOUSTON, Chattanooga.

Exodontia of Impacted Teeth, by DR. D. P. HOUSTON, Chattanooga.

Value of Orthodontic Treatment, by DR. O. A. OLIVER, Nashville.

ROENTGENOGRAPHIC STUDIES OF TISSUES INVOLVED IN CHRONIC MOUTH INFECTIONS*

BY ARTHUR D. BLACK, A.M., M.D., D.D.S., CHICAGO

IN A PAPER[1] presented before this section at the New York meeting last year there was included a tabulation covering a critical examination of three thousand roentgenographic films of the teeth and adjacent bone of the mouths of three hundred adults. During the past year these studies have been continued with results that very closely parallel the previous figures. The present tabulation, which includes that of last year, covers six hundred roentgenographic mouth examinations, for each of which ten small films were made—a total of six thousand films.[2]

The object of this study is primarily to determine as nearly as possible the average percentage of chronic mouth infections, which are of two types: *First*, those that begin with inflammations of the gingivæ and progress along the side of the root toward the apex destroying the peridental membrane and adjacent alveolar process—chronic suppurative pericementitis; *second*, those which, subsequent to the death of the pulp of the tooth, cause a destruction of the bone about the apex of the root—chronic alveolar abscess. Secondary to the foregoing, other data is being compiled, such as the existing relationship between these mouth infections and the general health, the number of teeth present at various ages, the number of teeth having root fillings, notations as to whether the root fillings are good or poor, and the frequency of alveolar abscess about the apexes of well-filled and poorly-filled roots. These studies are therefore considered to be of fundamental importance from two points of view: *First*, that of chronic mouth infections as a cause of systemic disease, and *second*, that of the dentist's technic in pulp treatment and root filling in relation to the occurrence of alveolar abscess.

An effort has been made to take roentgenograms of the mouths of persons as we meet them on the street, that is, without previous inquiry as to the condition of their mouths or their health, in order that our figures may represent average conditions. The six hundred persons included in the tabulation consist of about three hundred dental students, about fifty Dental and Medical Reserve Corps officers, about fifty of my own patients, and patients applying for dental service at Northwestern

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*Read before the Section on Stomatology (A. M. A.), 1918. THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement.

[1] Black, A. D.; Roentgenographic and Microscopic Studies of Tissues Involved in Chronic Mouth Infections, *The Journal A. M. A.*, Aug. 25, 1917, pp. 599-602.

[2] The six thousand films, mounted, were exhibited in connection with the presentation of this paper.

University Dental School. It is believed that the figures represent very close to average conditions for persons of less than forty years of age, but the number of infective foci in persons past forty is doubtless too high, because there are included a few who presented themselves because of systemic conditions that called for mouth examination.

Of the six hundred adults examined, 78 per cent. are shown by the roentgenograms to have definite areas of bone destruction about the teeth. If we make every possible allowance for variations from the average which these six hundred cases may represent, the fact remains that a high percentage of adults have chronic infections involving the maxillary bones. With our present knowledge of focal infections in relation to systemic disease, these mouth conditions constitute a serious menace to the health-producing power and longevity of the people.

AREAS OF CHRONIC INFECTION

The accompanying tabulation records areas of chronic infection about the teeth, in 57 per cent. of persons aged from twenty to twenty-four, 64 per cent. aged from twenty-five to twenty-nine, 88 per cent. aged from thirty to thirty-nine, 90 per cent. aged from forty to forty-nine and 98 per cent. aged fifty or more. As previously mentioned, the percentages for persons past forty are too high because of the fact that a number of those included in the tabulation presented themselves on account of their general physical condition. Attention is also called to the fact that a considerable number of persons past forty who are edentulous are also free from these infections. None of these were included in this study.

The areas of destroyed bone are given in two groups, under the headings "peridental infections" and "alveolar abscess." The term "peridental infections" is used here to cover all areas of bone destroyed along the sides of the roots of the teeth, from suppurations beginning in the gingivæ. The term "alveolar abscess" covers all areas of bone destroyed at the apexes of roots, subsequent to the death of the pulps of the teeth.

The peridental infections are very seldom found in the mouths of persons of less than twenty years. They are to be considered as lesions of adult life only, which are more frequent with advancing years. For the group between the ages of twenty and twenty-four, 13 per cent. had infections of this type; those aged from twenty-five to twenty-nine, 29 per cent.; those aged from thirty to thirty-nine, 68 per cent.; those aged from forty to forty-nine, 77 per cent.; those aged fifty or more, 88 per cent. These percentges alone do not tell the full story, as in addition to the increase in the number of persons with advancing years, there is also an increase in the number of areas per person, from four per person of those affected between the ages of twenty and twenty-four to ten per person in those aged fifty or more.

Alveolar abscesses are found in the mouths of persons of all ages. It would be expected that the number would increase with age, except for the fact that the number of abscessed teeth extracted serves to maintain a balance. In the present tabulation for persons aged from twenty to twenty-four, there are recorded 52 per cent. who have abscessed teeth; for those aged from twenty-five to twenty-nine, 51 per cent.; for those from thirty to thirty-nine, 63 per cent.; for those from forty to forty-nine, 59 per cent.; for those of fifty or more, 50 per cent. The number of abscesses per person does not vary much with age, the average being 2.6 per mouth for those aged from twenty to twenty-four having abscesses and the same for those of fifty or more. The lowest was 2.2 abscesses per person for those between the ages of thirty and thirty-nine. It is very interesting to note that last year's tabulation of three hundred persons showed 59 per cent. with alveolar abscess, while for the three hundred added this year only 41 per cent. had alveolar abscess. It is believed that this difference represents in some measure the better realization of the danger of these infections to health, with the result that a larger number of infected teeth have been extracted. No attempt has as yet been made to determine the percentage of abscesses in the mouths of persons of less than twenty years of age.

RESULTS OF QUESTIONNAIRE

It was not practicable to make thorough physical examinations of these patients, and only a limited number of reports of such examinations were obtainable. The effort was therefore made to secure by a questionnaire the best possible information as to the physical condition. Inquiry was made as to enlarged finger joints, muscles or joints which were occasionally painful, condition of the nose and throat, inflammation of eyes, attacks of appendicitis, etc. It is appreciated that this information is not very reliable, as it does no more than give a general idea of the health of the persons examined. Of the five hundred and one included in the questionnaire, three hundred and sixty-three are reported as entirely negative as to secondary systemic disorders, seventy-two complained of occasional muscular or joint symptoms, and sixty-six reported well-defined cases of arthritis, nephritis, appendicitis, etc. Forty-two, of the last group of sixty-six, were persons of forty years or older and a considerable number of these presented themselves because of their physical condition. None were hospital cases. The principal value which these figures on systemic conditions give to the tabulation is in showing that the large majority of those examined were in good health, from which fact we may conclude that the number of areas of infection reported are not likely to be far astray in the establishment of average figures, with the exception, already noted, of persons past forty.

The average number of teeth per person is an indication that the mouths probably have had average care by both patient and dentist.

TABULATION FROM 6,000 ROENTGENOGRAPHIC FILMS OF TEETH AND ADJACENT BONE IN MOUTHS OF 600 ADULTS*

Age	Number	Systemic Symptoms				Average number teeth per person	Peridental Infections			Alveolar Abscess			Summary		Root Fillings				Large Canals				Small Canals				Alveolar Abscesses		
		No History	Negative	Complaint of occasional muscular or joint symptoms	Well defined cases, arthritis, nephritis, etc.		Number of persons, some bone destroyed at sides of roots	Percentage having bone involved	Average number of infections per person for entire number	Number of persons, some bone destroyed at apexes of roots	Percentage having bone involved	Average number of abscesses per person for entire number	Number of persons having peridental or apical infections or both	Percentage of persons having infections of maxillary bones	Number of persons having root fillings	Total number teeth with root fillings	Percentage of all teeth having root fillings	Number of root apexes not clearly shown	Number of good root fillings	Number abscessed with good root fillings	Number of poor root fillings	Number abscessed with poor root fillings	Number of good root fillings	Number abscessed with good root fillings	Number of poor root fillings	Number abscessed with poor root fillings	Number abscessed with root fillings	Number abscessed, no root fillings	Total abscessed
20 to 24....	146	9	120	11	6	29.5	18	13	0.6	77	52	1.4	89	57	103	357	8.6	72	85	10	120	83	42	2	88	71	166	43	209
25 to 29....	119	9	90	14	6	28.5	34	29	2.0	60	51	1.3	75	64	83	338	9.8	60	54	8	111	66	41	4	60	45	123	49	172
30 to 39....	146	30	79	25	12	26.5	101	68	5.7	92	63	1.4	119	88	116	504	13.0	89	94	8	168	95	46	4	107	90	197	35	232
40 to 49....	111	29	51	13	18	24.0	87	77	7.1	65	59	1.5	100	90	80	329	12.0	74	60	2	117	75	28	7	42	41	125	36	161
50 and over.	78	22	23	9	24	22.0	69	88	9.0	39	50	1.3	77	98	46	167	8.9	32	50	3	54	40	27	2	28	24	66	42	108
Totals....	600	99	363	72	66	26.5	319	53	5.0	333	55	1.4	469	78	428	1,695	9.8	344	343	31	570	356	184	19	413	271	677	205	882

Large Canals: Upper—central incisor, cuspid, second bicuspid, lingual roots of molars; lower—cuspid, first bicuspid, second bicuspid, distal roots of molars.

Small Canals: Upper—lateral incisor, first bicuspid, buccal roots of molars; lower—incisors, mesial roots of molars.

SUMMARY OF ABSCESSES IN RELATION TO ROOT FILLINGS

			Number Abscessed	
Good root fillings, large canals	343		31	
Good root fillings, small canals	184		16	
		527		50
Poor root fillings, large canals	570		356	
Poor root fillings, small canals	413		271	
		983		627
		1,510		677

*Percentage of abscesses for all root fillings, 45; for good root fillings, 9; for poor root fillings, 63.

*The figures given in this tabulation are believed to be very close to average figures for persons under 40; for older persons they doubtless show a higher percentage of infection than the average.

It is noted that for the four hundred and eleven persons in the three groups covering ages from twenty to thirty-nine, there is an average of twenty-eight teeth. As the third molars are not constant in development, there is an average loss of less than four teeth per person up to thirty-nine years.

ROOT-CANAL FILLINGS

A feature of this tabulation of especial interest to dentists is the occurrence of alveolar abscess in relation to good and to poor root-canal fillings. For this study the roots of the teeth were divided into two groups: those having large canals and those having small canals. This division was made because of the differences in technic required. The upper central incisor, cuspid, second bicuspid, and lingual roots of molars, the lower cuspid, the first and second bicuspids, and the distal roots of the molars were classed as having large canals. The upper lateral incisor, first bicuspid and buccal roots of molars, and the lower incisors and mesial roots of molars were classed as having small canals.

The roentgenograms showed sixteen hundred and ninty-five teeth with root fillings. This is 10 per cent. of all of the teeth in the mouths of the persons examined. Of these teeth, three hundred and forty-four were not included in the special study of root fillings, because the shadows were not sufficiently clear for positive reading. Each root of multi-rooted teeth was counted separately. There were recorded a total of three hundred and forty-three good root fillings in large canals, of which thirty-one were abscessed, and five hundred and seventy poor root fillings in large canals, of which three hundred and fifty-six were abscessed. For the small canals, there were one hundred and eighty-four well filled, of which nineteen were abscessed; four hundred and thirteen poorly filled, of which two hundred and seventy-one were abscessed. This gives only 9 per cent. abscessed of all teeth having good root fillings, and 63 per cent. abscessed of all teeth having poor root fillings. Doubtless some in both groups were abscessed before the root fillings were made. It seems that no better argument could be found to induce dentists to be more painstaking in their root-filling technic, for here is the opportunity to reduce the total of alveolar abscesses to about one-fifth of the present number—an effort very well worth while.

It should be stated that we have been very liberal in classifying these root fillings; if we have erred it has been by placing an excessive number in the "good" columns. It is appreciated that it is not always possible to determine the condition of a root filling by examination of a roentgenogram. Fillings were classed as good if the root apex was apparently filled or in those cases in which the root filling did not reach to the apex, if no canal was discernible beyond the root filling. By this plan, all questionable fillings were given the benefit of any doubt.

CHANGES IN DENTAL PRACTICE

The effect of the study of these cases is well shown by the changes that have been noted in the clinic of Northwestern University Dental School. The roentgenographic service has been increased several fold as compared with a few years ago, a total of more than seventeen thousand films having been made during the past year. In the same period nearly twenty-four thousand teeth were extracted, and the number of artificial crowns and bridges much reduced, while there has been a corresponding increase in the number of artificial dentures made for patients. This is an expression of the changes in dental practice throughout the country. A constantly increasing number of dentists are coming to realize that it is their positive duty to free the mouths of patients from infection, even though this requires the extraction of a number of teeth. But what is of much more importance, there is a determined effort on the part of many to use every possible means of preventing the occurrence of these chronic mouth infections, and those who have seriously undertaken to do so are meeting with a large measure of success. This is preventive dentistry that is worth while, for it is cutting off at the source much systemic disease.

DISCUSSION

Dr. Eugene S. Talbot, Chicago: Dr Black speaks of so many cases of root filling and then so many abscesses. I would like to have him tell how he knows these are abscesses. My researches have shown that we must classify, that we must know exactly what takes place at the roots of the tooth. Many of these cases that are called abscesses are not abscesses. They are simply absorptions. In all these experiments that I have been doing the last three or four years, with the microscope, destroying pulps of teeth and then immediately conducting the different drugs that we use through the ends of the roots of the teeth, this sequence invariably takes place. The irritation produces an absorption of the alveolar process. It depends on the amount of the irritation as to where that absorption stops. If it is a slight irritation, the absorption of bone will take place and fibrous tissue will remain around the end of the root of that tooth. That absorption may or may not be very extensive. If the irritation is more severe than what I have just mentioned, the fibrous tissue will be destroyed around a certain area, and that absorption and destruction of fibrous tissue takes on the appearance of what is called an abscess under the roentgen-ray. I have noticed that many cases which present conditions that were considered abscesses were not abscesses, but simply absorptions of the alveolar processes and roots and destruction of the peridental membrane at the end of the root of the tooth. If the irritation is still greater, with infection, so that even the fibrous tissue is destroyed, an abscess will form. There are three conditions or stages which we must understand and classify by the roentgen-ray. I have not been able to classify these with the roentgen-ray. We must first examine the case with absorption in order to show the three different conditions that take place. I want Dr. Black to explain these three different conditions, if he can, and why he calls these cases abscesses. The other condition is where the fibrous tissue will remain after the absorption of bone. The next is where the irritation and infection are so great that an abscess will form. *First*, there is absorption of bone and root. The peridental membrane still remains because there is not sufficient irritation to produce a destruction of the peridental membrane and fibrous tissue. *Second*, the peridental membrane and fibrous tissue are destroyed without an abscess forming. *Third*, the fibrous tissue remains around the root of the tooth and an abscess forms in this fibrous tissue and remains after absorption of bone has taken place. These are the three actual conditions that occur and are seen with the microscope.

Dr. Thomas L. Gilmer, Chicago: I am in accord with Dr. Talbot's statement that there is in some instances, indication of absorption of the process when no infection exists. After examining roentgenograms, we are sometimes left in doubt, whether abscesses exist or not. There may be a very limited area of bone destruction followed by a thickening of the pericementum when no infection exists. I am of the opinion, however, that in the majority of these cases the areas are infected. My reason for this belief was strengthened by my study of the bacteriology of alveolar abscess. I extracted a large number of pulpless teeth and secured the *Streptococcus viridans* from almost all cases, when the roentgenograms showed rarefied areas. Alveolar abscess, when some of the apical peridental membrane has been destroyed, may be cured temporarily by sterilization of the root canal, but it is for a very limited period, because there will be reinfection sooner or later through the organisms being carried to the dead cementum by the blood stream.

Dr. Arthur Zentler, New York: Whether or not the roentgenogram can be relied on to tell the condition present at the apical end of a root is not established. While some doubt has been expressed here as to whether there is or is not an abscess when the roentgenogram indicates absorption, there remains to be shown whether when the roentgenogram does not show absorption, that there actually is no pathology. I have been impressed with this unreliablity. Experiments which I carried on to establish whether conservative (electrolytic) treatment is sufficient to cure pathologic conditions at the apexes of roots, or whether apicœctomy is necessary to obliterate the infection, have resulted in the following: *First*, teeth which were treated conservatively and which in the roentgenogram showed no absorption, were apicœctomized several months after treatment and the cultures have yielded streptococci. *Second*, the same areas were cultured four or six months later under the same conditions as for doing a root amputation, and although the roentgenogram indicated absorption (due to repeated surgical interference), cultures made from scrapings yielded no bacterial growth. To my mind this shows that lack of absorption in the roentgenogram does not indicate sterility, nor does the presence of absorption indicate infection at the end or around the root of the tooth.

Dr. Frederick B. Moorehead, Chicago: The work that Dr. Black has done in his report is reassuring in that it confirms the fundamental things we have believed for some time. I examined five hundred cases at the Presbyterian Hospital, Chicago, and reported my results to this section two years ago. My findings were essentially the same as those reported by Dr. Black. Considerable experience and study is required in the interpretation of roentgen-films of the jaws, and even to the experienced there will be surprises now and then in the amount of pathology that will be found clinically which did not appear in the film. It must be borne in mind always that the roentgen-ray is a relative agent, and while it is the most important factor in diagnosis, it requires experienced interpretation. The fact that one frequently finds more pathology on the removal of a tooth than is indicated by the roentgen-ray should make us very careful in concluding from a roentgenogram that a tooth is safe.

As Dr. Gilmer suggested, there are cases in which it is very difficult to differentiate between a dangerous focus and one that probably is not dangerous. These difficult cases, however, are more or less limited in number and the majority of films indicate conditions about which we may be more or less dogmatic. We found one very striking thing in our patients in the Presbyterian Hospital in noting that there was not a great deal of difference between the ward patient and the private patient in the number of mouth involvements. This probably is due to the fact that the poor people have troublesome teeth extracted while those of means have root-canal treatment. We must all become convinced of the danger of chronic infection about the jaws and the necessity for the removal of all types of infection.

DR. CHALMERS J. LYONS, Ann Arbor, Mich.: We must not overlook the mistake that both the dental and medical professions are making today of relying wholly on roentgenograms. I am very much interested in Dr. Talbot's remarks that we should not consider the roentgenographic evidence alone. It is simply one method of making a diagnosis and I am wondering if in the report Dr. Black has made that some distinction might not be made between what he calls an abscess of the roots with poorly-filled canals, and an abscess of a root with well-filled canals. While the roentgenographic evidence would admit of some error, without a complete history of that particular operation, I do not see how he can classify a tooth with a perfectly or well-filled canal having an area of absorption as an abscess. If that is true, if they can be so classified, then our whole root-canal work is in vain.

DR. WILLIAM C. FISHER, New York: I am very glad to hear one part of Dr. Black's report in which he studies the good and bad root fillings in order to differentiate them in reading his roentgenograms. He classifies them as cases with good root filling and those roots in which the filling did not go to the apex. This is the first time that I have seen or heard any one attempt to make that statement and I am very glad that Dr. Black has made it, because in that one point I consider great advance has been made. Dr. Zentler's work is a step in the right direction, especially the manner in which he has investigated the bacteriologic findings. As Dr. Talbot and Dr. Lyons brought out, can we tell whether these areas that we speak of off-hand from roentgen-ray evidence as abscesses are really abscesses unless we have checked up this evidence with other work? Dr. Moorehead said the more we read roentgenograms the better are we able to interpret these facts. No mention has been made of the particular bacteria found other than what usually is found in these abscessed areas. It is a question in my mind as to just how much the system can stand in the way of the normal presence of *Streptococcus viridans* or, as Dr. Moorehead said, in the safe and dangerous zones of infection.

DR. ARTHUR D. BLACK, Chicago: I endeavored to present certain conditions that were shown by examination of six thousand roentgenograms, and I believe I qualified that by saying that I presented tabulations of the areas of destruction of bone. Then I stated further that in order to simplify the presentation I called one group peridental destruction, and the other apical destruction. The main point I desire to impress is that over 75 per cent. of the people over twenty have destruction of bone about the roots of teeth.

I would base my judgment in deciding on the treatment of any case showing an area of destruction about the root of the tooth, on the extent of the detachment of the peridental membrane from the surface of the root. If the studies of the histologic function and pathologic changes which take place in these tissues are worth anything to us at all, they certainly tell us that where the peridental membrane has been detached and that detachment has been maintained for a time, there will not be a regrowth of this tissue. If there is a hole in the bone about the end of the root of the tooth, showing that the peridental membrane has been destroyed, then I would not bother to determine whether the area is infected or not, as it would not make a particle of difference in the treatment. If the area is not infected today it may be infected through the circulation tomorrow. I have no doubt that a considerable number of these cases go along for a long time without infection, but they certainly present ideal conditions for reinfection. Granting for the moment that by the use of drugs such an area may be rendered sterile, there could not be more than a very temporary advantage because there is no probability of reattachment of tissues to the root of the tooth. When the roentgenogram shows an area of bone destroyed immediately about the surface of the root, I believe it should be treated as though it were an abscess whether there is any infection or not.

There can be no question that the number of persons having infections of the bones about the teeth is very much larger than it ought to be. It must be less in the future, and the burden of reducing it is on the dental profession. At the same time, we must remind the members of the medical profession that there are many other regions besides the mouth in which the original foci of infection occur. When we come to realize that 75 per cent. of adults have some infection of the maxillary bones, it seems that three out of every four persons, who go to the physician complaining of some systemic infection, have one or more of these areas in their mouths. I am afraid that too many physicians are jumping at the conclusion that the teeth are the source of the trouble, without making a thorough investigation of other regions, such as the nose and throat, the sinuses of the head, the mastoid, the gall-bladder, the genito-urinary tract, etc.

Every adult who comes to us should have a complete roentgenographic examination of the mouth. When each dentist takes on himself the responsibility of knowing that the mouths of his patients are free from infection, he will have made real progress in the prevention of systemic disease.

Dr. William C. Fisher: Do you believe that in any dead tooth perfectly filled or imperfectly filled you have this area whether it has been treated surgically or not?

Dr. Arthur D. Black: It does not necessarily follow that because the pulp of the tooth dies the bone about the apex of the root will be infected. That is the natural thing to happen, but I feel quite satisfied that it does not always happen, otherwise practically every tooth with a dead pulp should be extracted. We are requiring that a roentgenogram be made of every tooth that has a dead pulp before treatment is undertaken. We are getting many films of cases with dead pulps which show no destruction of tissue about the apex of the root. It is a question of following these up for a number of years by roentgenographic examination. My judgment is that there are many cases in which there is no infection beyond the apex of the root.

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Faculty:—Lieut.-Col. Guy G. Hume, Officer in charge Dental Service at Ontario Military Hospital, Orpington, England; Vice-President Congres Dentaire Interallies; Professor of Orthodontia, Royal College of Dental Surgeons.

Major W. E. Cummer, in charge of Special War Prosthseis and Facial Restoration, Canadian Army Dental Corps, Military District No. 2; Professor Prosthetic Dentistry, Royal College of Dental Surgeons.—"War Prosthesis, Fractures, Splints."

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THE LYMPHATICS OF THE DENTAL REGION*

BY FREDERICK B. NOYES, B.A., D.D.S., AND
KAETHE W. DEWEY, M.D., CHICAGO

IN PLACE OF the usual review of the progress of dental science and art, in the year past, which is given in a chairman's address, your chairman has decided to present a report of the work done in the Histological Laboratory of the College of Dentistry of the University of Illinois in the last three years. Two years ago, at the Detroit session, the first of this work was reported to this section.

First, I want to say that the technical work has been done by Dr. Dewey, in my laboratory, and she has prepared the review of the literature.

THE LYMPHATIC SYSTEM

Schweitzer[1] deserves the credit of first demonstrating, by injection, the presence of lymphatic vessels in the dental pulp and peridental membrane. Our work has corroborated his results, and filled out some of the gaps in his findings, especially in showing through its entire extent the drainage from the dental pulp, and the course of the vessels in the infraorbital and inferior dental canals.

To those who are not familiar with this field of work, it may be well to say a word in regard to the character of the lymphatic system. All the cells of the body are bathed in fluid with which, through metabolism, they are in vital reaction. This fluid passes out through the walls of the blood capillaries into intercellular or interfibrous spaces, from which it is collected into minute canals, or spaces, lined by endothelial cells. These are known as the lymph capillaries. From these the fluid passes into larger channels with delicate endothelial walls, and finally into large lymphatic trunks, some of which have walls similar to the veins. The fluid is finally returned to the blood circulation through a valve-guarded opening into the subclavian vein. Along the course of these channels are interposed many lymphatic glands or lymph nodes.

As a general statement, lymphatic vessels are present wherever connective tissue is found. As long ago as 1891, Foster[2] said, "Of all the varied functions of connective tissue perhaps the most important is this relation to the lymphatic system; in nearly every part of the body connective tissue serves as the bed or origin of lymphatic vessels."

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*Chairman's address, Section on Stomatology, American Medical Association, Chicago, June, 1918. THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement A. M. A.

[1] Schweitzer; Über die Lymphgefæsse des Zahnfleisches und der Zæhne beim Menschen und bei Sæugetieren, Arch. f. mikr, Anat., 1907, 69, 807; 1909, 74, 927.

[2] Foster, Sir Michael; A Text book of Physiology.

Failure to inject them cannot be taken as proof that lymphatic vessels do not exist in a given location. Because of their inaccessibility and the structural peculiarities of the tissues, the dental system has long resisted all attempts to demonstrate the presence of lymphatic vessels.

The difficulty of injecting lymph vessels, as compared with blood vessels, can be readily appreciated. In some places large lymph vessels can be found, and because of the rich, plexus-like anastomosis of the small channels, they can be injected backward. In the dental region, however, this is quite impossible because of their minute size and the delicacy of the walls.

In the dental region, the method employed consists in slowly and gently carrying the fluid into intercellular and interfibrous spaces and by careful massage, forcing it through the interlacing, plexiform channels. In this way the injecting fluid is made to follow the natural course of drainage of the area, and to a limited extent can be forced backward into the other lymph capillaries. If this is kept in mind, it will be easier to interpret the illustrations.

LYMPHATIC VESSELS OF DENTAL SYSTEM

I will now describe briefly the arrangement of the lymphatic vessels of the dental system as made out by previous workers and as shown in our work.

Sappey[3] describes and beautifully illustrates the lymphatic vessels of the mucous membrane of the mouth, cheeks and lips. He shows a very rich plexus of lymph capillaries in every connective tissue papillæ of the mucosa. These are drained into a rich delicate network in the submucosa, passing downward over the buccal and lingual surfaces of the alveolar process, and at the reflection from the bone to the cheek, or the bone to the tongue, forming a wreathlike network. In the lower jaw, this wreathlike network is drained by a few efferent trunks: on the outside, passing from the median portion to a submental lymph node and from the lateral portion to the submaxillary and superficial cervical nodes; on the lingual side, near the median line a few efferent trunks pierce the floor of the mouth and pass to the submental node. At the posterior portion they anastomose with the vessels from the sides of the tongue and the pharynx and pass chiefly to the median nodes of the upper group of deep cervical nodes.

In the upper jaw the wreath lying between the maxilla and the reflection of the cheek is drained by a few efferent vessels, most of which follow the facial vessels and reach the larger submaxillary nodes. On the lingual they run across the hard and soft palate and to the upper nodes of the deep cervical group, usually of the same side but anastomosing and often crossing to those of the opposite side.

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[3] Sappey; Anatomie, physiologie, pathologie des vaisseaux lymphatiques considérés chez l'homme et les vértébrés, Paris, 1874.

Sappey's description is confined, as far as the peridental membrane is concerned, to vessels lying to the occlusal of the ligamentum circulare.

I want now to emphasize the difference in the course of the lymphatic vessels from the papillæ of the buccal and lingual slopes of the gingivæ, as compared with the course of those from the long, slender papillæ of the subgingival space (the side next to the tooth). As Sappey describes, the former do not penetrate the ligamentum circulare but pass down along the periosteum and to the wreathlike network at the reflection of the lip and cheek. The latter penetrate the ligamentum circulare and extend toward the apex of the root in the peridental membrane. *Figure 1* shows the lymphatic capillaries of the papillæ of the subgingival space, passing among the fibers of the peridental membrane close to the cementum, penetrating the ligamentum circulare and into the larger vessels coursing toward the apex of the root in the peridental membrane.

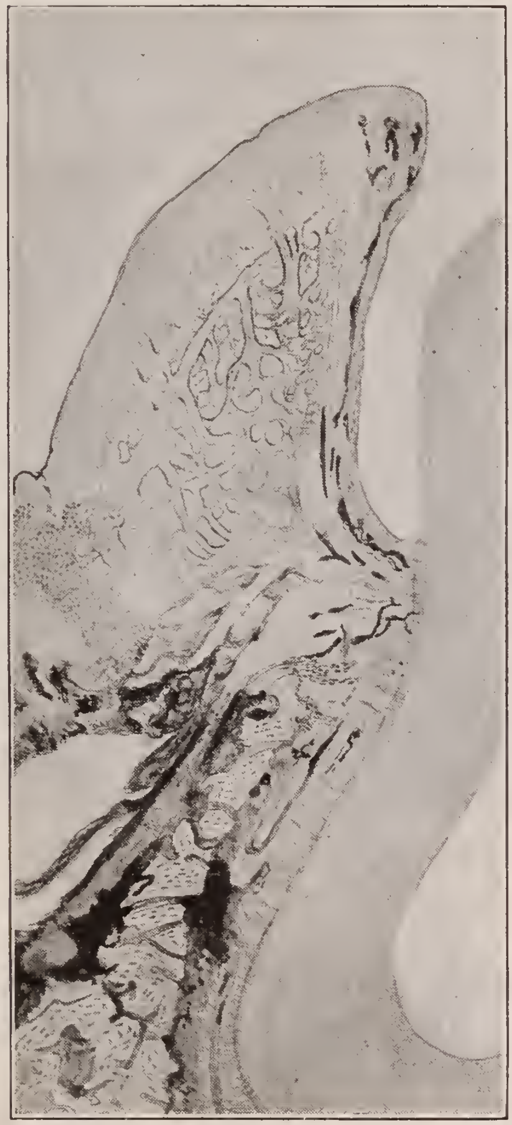

Fig. 1.—Unstained section, showing lymph capillaries of the tooth side of the gingivæ and their drainage through the ligamentum circulare to the peridental membrane.

Figure 1 was drawn with the camera lucida from an unstained section. The results of this injection, as shown by this and other sections and as made out from careful dissection, may be described as follows: The needle was inserted under the periosteum well down on the side of the alveolar process, and the fluid slowly injected, with careful massage during and after injection. It will be seen that a lake was formed on the outside of the process from which the lymphatic vessels have carried the fluid through the spaces of the bone into the vessels of the peridental membrane. These have been filled in both directions, the fluid passing in them, occlusally and toward the apex. Occlusally it has passed through the minute vessels even into the ends of the papillæ of the subgingival space. Passing apically, comparatively large vessels can be seen, as well as many small ones. *Figures 2 and 3* were drawn from transverse sections of similar injections.

The connective tissue accompanying the blood vessels and nerves is seen to contain many injected lymphatic vessels. These continually anastomose with vessels in the spaces of the bone. At the apex of the root the vessels anastomose with lymphatic vessels which accompany the blood vessels through the foramina in the cementum into the dental pulp. *Figure 4*, which is cut transversely just at the apex of the root, shows one vessel passing from the pulp to the peridental membrane, and several cut transversely in other foramina. On reaching the pulp chamber, the lymphatic vessels are either perivascular or independent. The material seems to show that most of the larger blood vessels in the central portion of the pulp have perivascular lymph sheaths; but there are also good sized lymphatic vessels lined by endothelial cells independent of blood vessels. The latter seem to be chiefly toward the periphery of the pulp.

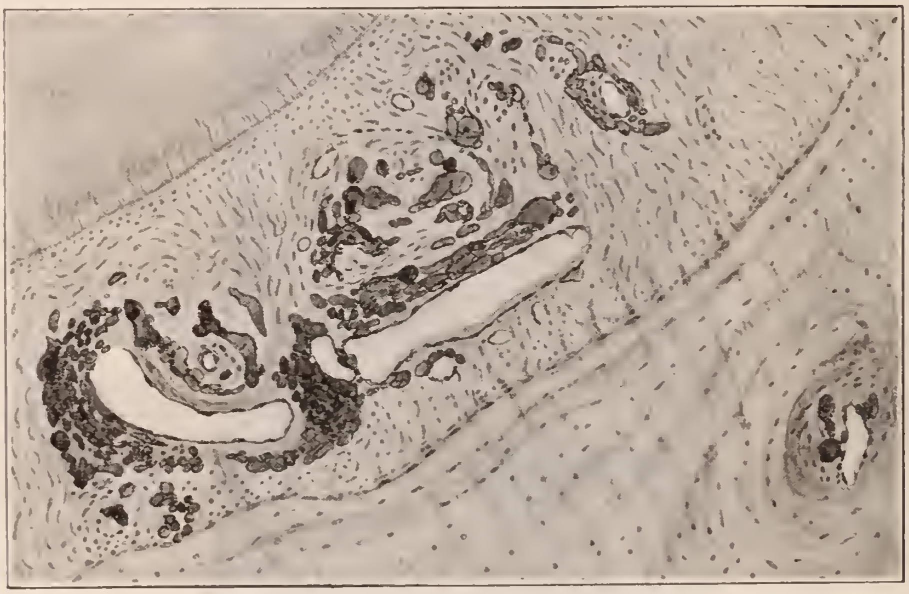

Fig. 2.—Transverse section of the peridental membrane, showing injected lymphatic vessels (camera lucida, oc., 3; obj., 16 mm.; reduced about one-third).

Figure 5 was drawn from a thick, unstained section. The injecting fluid has been forced out through lymph vessels into intercellular spaces in the pulp, and seems to be surrounding the odontoblasts. The coloring matter has even been dissolved into the dentinal tubules in some places. From this area small vessels may be seen uniting into a larger vessel. Several of these sections seem to indicate that the intercellular lymph spaces communicate with the dentinal tubules, and in this the experimental evidence corresponds with the clinical experience of discoloration of the dentin by the solution of blood pigments being carried into the dentinal tubules in infarction of the dental pulp.

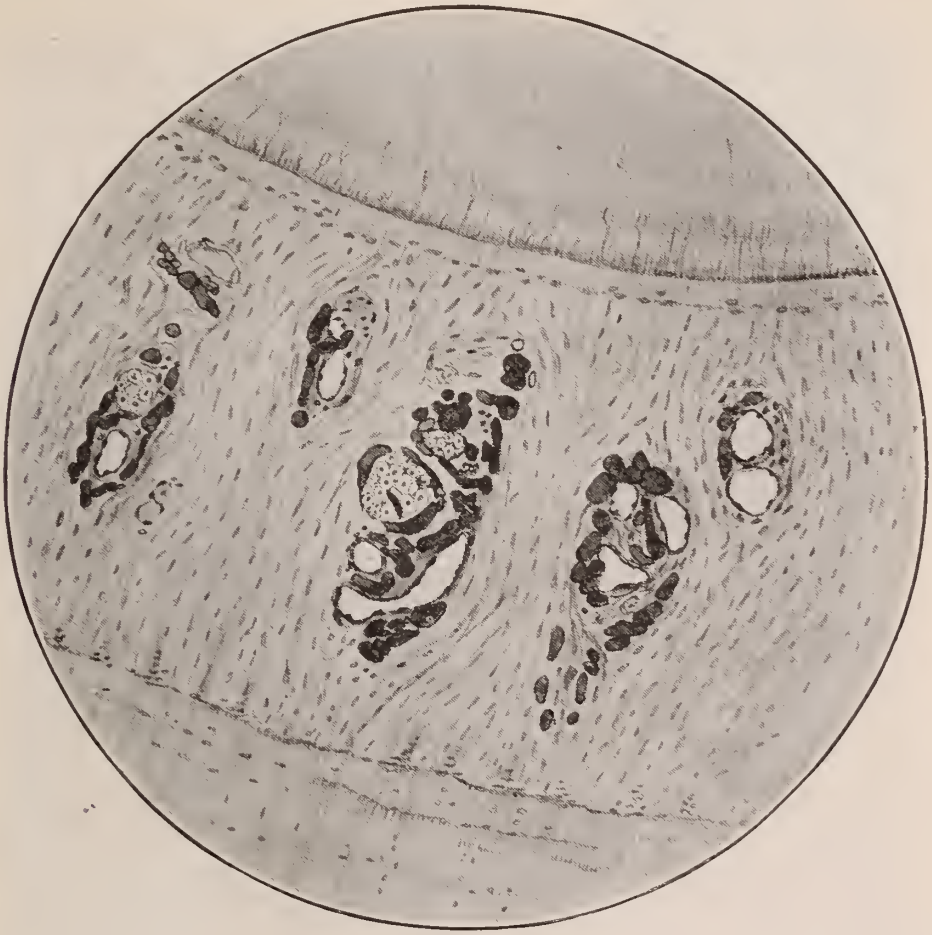

Fig. 3.—Transverse section of the peridental membrane, showing injected lymphatic vessels (oc., 3; obj., 16 mm.; reduced about one-tenth).

The lymph vessels from the dental pulp pass through the apical space into the spaces of the bone, anastomosing with the rich lymphatic network in this tissue. The vessels pass to the periosteum, but drain to the inferior dental canal in the lower jaw and the infraorbital canal in the upper jaw. Here they form a rich plexus around the blood vessels and in the sheaths of the nerve trunks. *Figures 6 and 7* are photomicrographs of these areas and show these vessels well injected.

The vessels pass out of the mental and infraorbital foramina, pass in a superficial course, and follow the facial artery and vein passing to the large submaxillary lymph nodes. *Figures 8 and 9* are drawings of a head in which the vessels could be followed all the way from these foramina to the glands. In this head the only injections were into the pulps of the canines and first molars. Microscopic sections of the glands from similar specimens showed the injecting material to be in the lymph spaces of the glands.

Our work supplements that of Schweitzer in two important ways: *first*, in showing the injection of the lymphatic vessels in the inferior dental and infraorbital canals, and so showing the complete course of drainage to the submaxillary nodes; and *second*, in showing the same course by injections only into the pulps of the teeth.

Subperiosteal injection of the lymphatics is especially interesting in reference to infiltration anesthesia, and the course of lymphatic drainage from the papillæ of the subgingival spaces is especially important with reference to the progress of destructive inflammation of the peridental membrane.

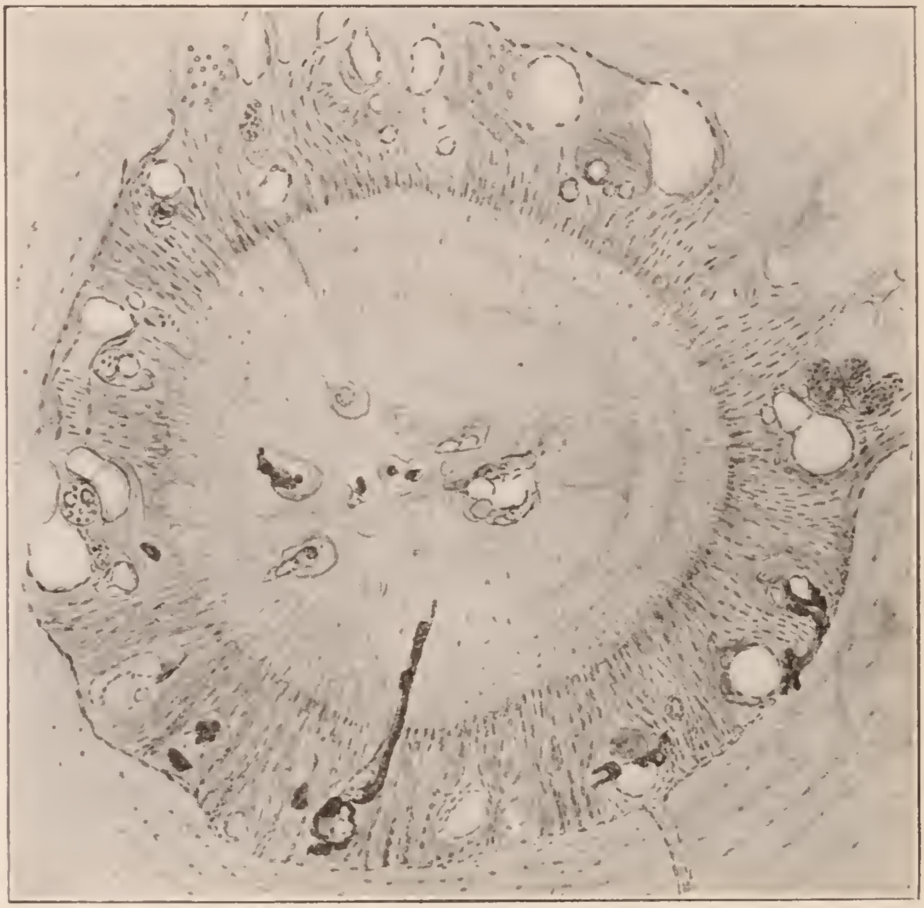

Fig. 4.—Transverse section just at the apex of the root, showing injected lymphatic vessels in the peridental membrane and in the canals passing to the pulp (oc., 2; obj., 16 mm.; reduced about one-third.)

REVIEW OF LITERATURE AND TECHNIC

The only report in literature of successful injection of the lymphatic vessels of the peridental membrane is one by Schweitzer[1], who was also the first to demonstrate the presence of lymph vessels in the dental pulp. Other references about lymph vessels in the peridental membrane are limited to mere suggestions and the assumption that they may exist. Ebner[4] describes as structures belonging to the lymph system reticular meshes filled with lymphoid cells, which may be found embedded within the dense fibrous tissue about the teeth. Black[5] referred to nests of nucleated cells in the peridental membrane near the cementum as "lymphatic" glands. In later publications he modified this view to the effect that these cell collections may be glandular structures. Dorendorf,[6] who made a study of the lymphatic circulation of the lip with reference to the spread of carcinoma, extended his experiments to injections of the lymph vessels of the gingiva and the periosteum, but only brief protocols of the results of the injections are given, because, as he states himself, complete specimens could not be obtained.

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[4] Ebner; Weichgebilde der Zæhne, Scheff's Handbuch der Zahnheilkunde, Vienna and Leipzig, 1909, 1, 269.

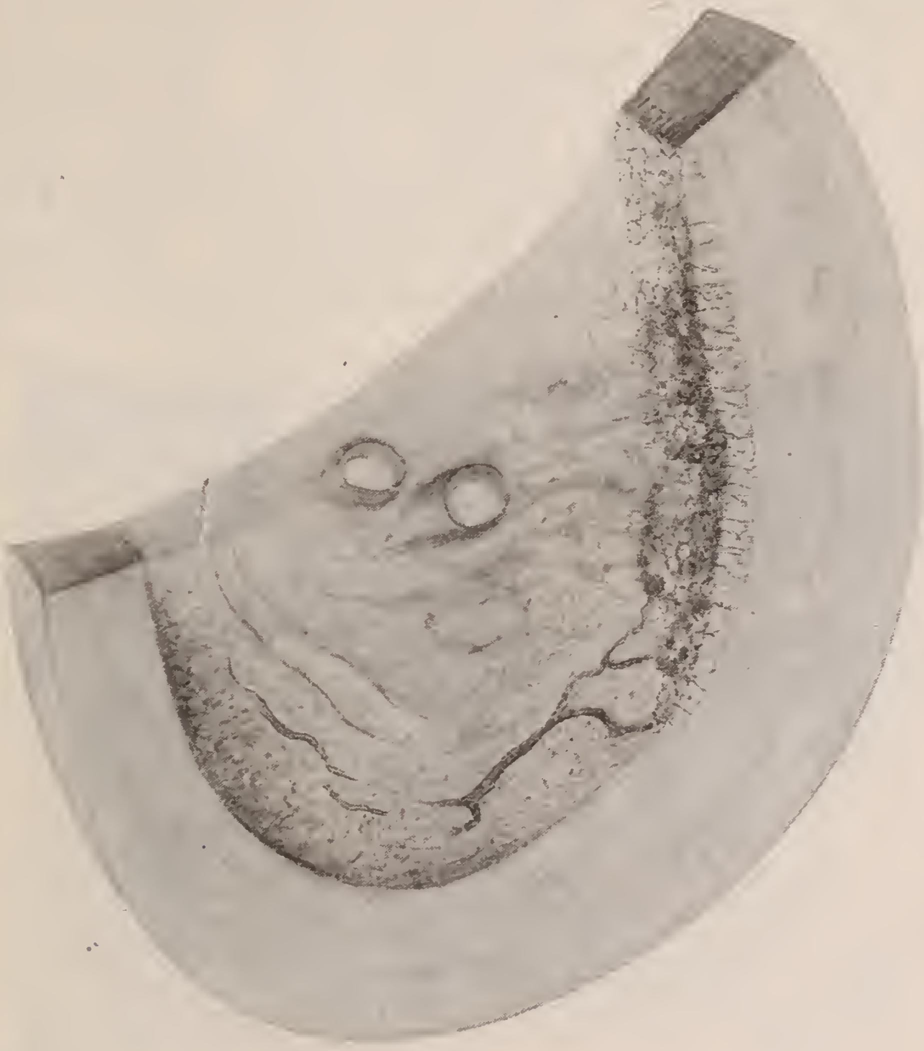

Fig. 5.—Diagrammatic drawing of a section of a tooth, showing injected lymphatic vessels in the pulp.

The lymphatics of the gingiva are better known. Sappey[7] gives a clear picture of the arrangement of the lymph system in the gingiva and the palate, but fails to refer to any lymph vessels in the peridental membrane, while he mentions unsuccessful attempts to demonstrate lymph vessels in the dental pulp and does not hesitate, in spite of failures, to express his belief that they may exist.

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[5] Black; A Study of the Histological Character of the Periosteum and Peridental Membrane, 1887.

[6] Dorendorf; Uber die Lymphgefæsse und Lymphdrusen der Lippe mit Beziehung auf die Verbreitung des Unterlippencarcinoms, Internat. Monatschr. f. Anat. u. Phys., 1900, 17, 201.

[7] Sappey (Footnote 3), p. 69.

The older method of injecting lymph vessels with mercury which has yielded excellent results in such skillful hands as Sappey's, has been largely superseded by methods employing less heavy injection masses, and it is most likely due to the greater power of penetration of the more fluid masses that lymph vessels could be demonstrated which failed by mercury injection methods. The mass in most common use now is the so-called Gerota mass, Prussian blue or Berlin blue in the oil color, dissolved in turpentine oil and sulphuric ether. With this mass and a method known as the Gerota method, Schweitzer was able to inject successfully the lymph system of the peridental membrane and to a less complete degree lymph vessels of the dental pulp. The general picture of the lymphatic arrangement in the peridental membrane, as Schweitzer expresses it, is that of a funnel extending from the deepest layers of the gingiva down into the alveolus. The walls of this funnel lying in the peridental membrane consist of a dense network of lymph capillaries in several layers, anastomosing with one another. The main trunks, which arise from this network and which are larger than the blood vessels, run in a direction longitudinal to the axis of the tooth. They communicate with one another by numerous anastomoses. At the level of the ligamentum circulare, lymph vessels are present in several rows which surround the tooth like a wreath. The vessels ascending from this assume the form of lacunæ and round masses, which in sections have the appearance of bunches of grapes. Numerous anastomoses connect the lymph vessels of the peridental membrane, *first*, with the neighboring larger lymph vessels passing through the bone; *secondly*, at the inlet of the alveolus with the deep lymphatic network of the gin-

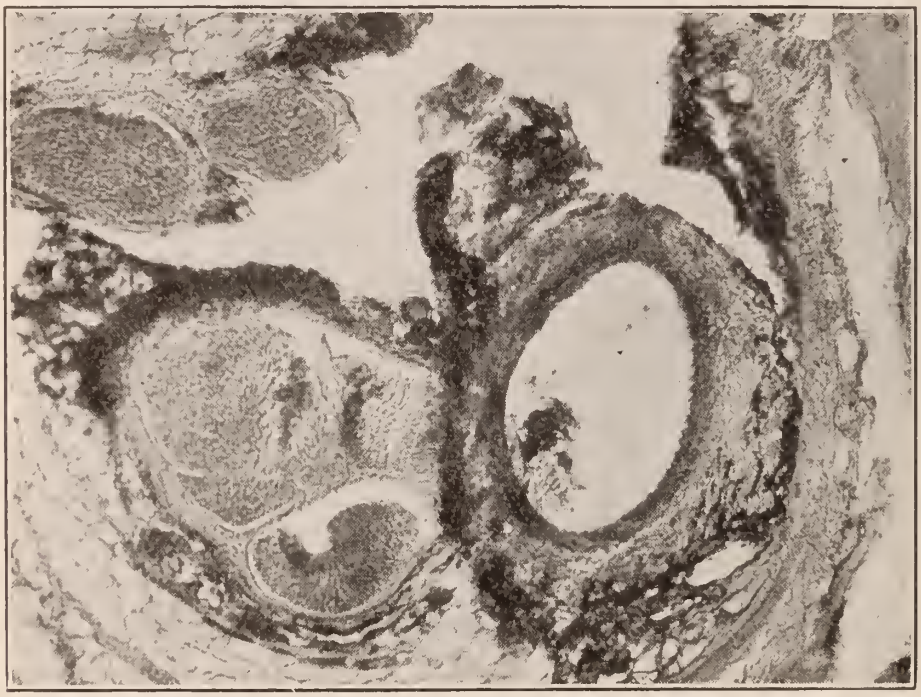

Fig. 6.—Photomicrograph, showing injection of perivascular and perineural lymph spaces in the vessels of the inferior dental canal.

gival submucosa, and *thirdly*, at the apex of the root with the lymph vessels accompanying the larger blood vessels entering and leaving the dental pulp and therefore also with the lymph paths of this organ. In the lower jaw they communicate also with the lymph vessels which follow the blood vessels and nerves within the mandibular canal.

The lymph vessels of the gingiva have been successfully injected by several investigators. Sappey was the first to demonstrate them, and the accuracy of his statements has been, in the main, verified by the results of later workers. After having described the lymphatic apparatus of the gingiva, he expresses the view that one should expect the dental bulbs, which are actually nothing else than papillæ of the mucous membrane, to be provided with lymph vessels like all other papillæ of the integuments. In fact, in spite of his failures to inject them, in the adult, the child and the fetus, he is still inclined to believe in their existence. According to Sappey, the vessels of the gingiva passing between the teeth unite into one vessel on either side on each jaw, and in the region of the last molar pass down into the deeper tissue. Most[8] admits the efferent vessels apparently are relatively scanty in number, but he believes that they are more numerous than Sappey claims; their demonstration by injections is difficult because the lymph capillaries in this region are extremely delicate, conforming to Teichmann's law that (so-called) lymph capillaries decrease in size and width the more delicate the mucosa is and the more the latter adheres to the subjacent tissue. Most was generally able to inject one, two and three trunks.

An interesting exception to another general principle laid down by Teichmann, known as Teichmann's rule, has been observed by Schweitzer to occur exclusively in the gingiva. According to this rule, the last terminals of the lymphatic apparatus always lie deeper, that is, more centrally than the blood capillary network. In the gingivæ we find reversed condition. Schweitzer admits that he is unable to explain the purpose of this exceptional arrangement. This investigator has made the most extensive practical study of the lymph system of the tissues about the dental apparatus. By using several coloring masses for injecting the different portions, he attempted to ascertain the regional drainage of the lymph from the gingiva and the teeth.

The following is a summary which Bartels[9] has given of the results obtained by Schweitzer: The gingiva contains an extremely delicate, fine meshed network from which lymph vessels arise, which partly pass outward, and partly continue their course inward. The outer drainage paths collect in plexuses which surround the two halves of the jaw like a wreath along the upper and lower fold of the mucous membrane of the cheek, and form median anastomoses. From the plexuses numerous twigs pass from all parts of the alveolar processes along the vicinity of the anterior fascial vein to all submaxillary glands. In rare cases also the submental glands have been injected from the region of the four lower incisors (one case each of Schweitzer, Dorendorf and Polya and Navratil[10]). The inner drainage pathways originate as the outer ones. Those of the upper jaw differ in their course from those of the lower jaw. The former pass through the mucosa of the hard palate and from the lateral end of the alveolar processes over the soft palate and the pharyngeal wall downward and enter directly into the deep cervical glands. Generally they empty into the glands of the same side, but not rarely they cross and pass into the corresponding glands of the opposite side The inner drainage pathways of the mandibular gingiva pass from the region of the incisors along the lingual surface of the jaw through the mylohyoid muscle to the anterior submaxillary gland, and from all regions along the transitional fold to the deep cervical glands.

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[8] Most; Die Topographie des Lymphgefæssapparates des Kopfes und des Halses, in ihrer Bedeutung für die Chirurgie, Berlin, 1906, p. 98.

[9] Bartels; Bardeleben's Handbuch der Anatomie des Menschen, 1909, 3, Part 4, Das Lymphgefæssystem.

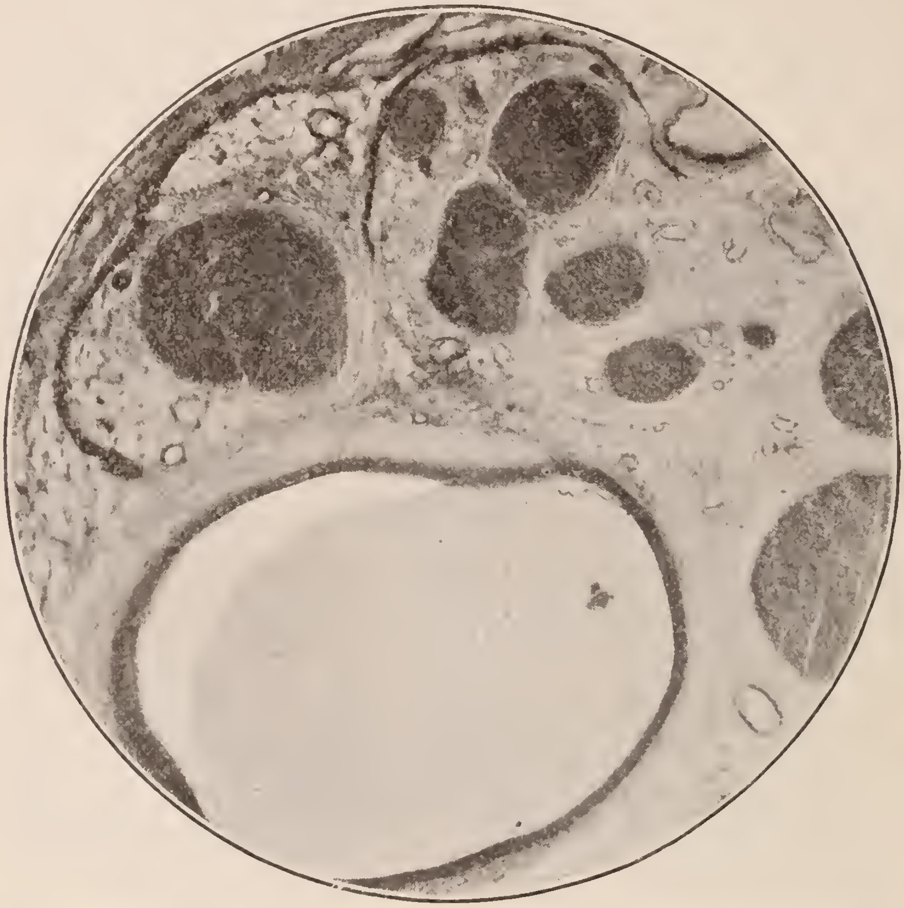

Fig. 7.—Photomicrograph, showing injected perineural lymphatics in the infraorbital canal.

As to the pathways draining the teeth, Schweitzer admits that he has not reached complete and final issues; some conclusions are still represented as "probabilities." He says:

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[10] Poya and Navratil; Untersuchungen Eber die Lymphbahnen der Wangenschleimhaut, Ztschr f. Chir., 1903, 66, 122.

"As lymph paths from the teeth of the upper jaw, at least for part of them, we may consider as very probable, lymph vessels which emerge from the infraorbital foramen or smaller secondary openings to the outer surface of the maxilla and pass to the submaxillary glands (media and posterior). In the lower jaw the lymph flows through rami dentales into lymph paths which course within the mandibular canal. Although it has hitherto not been possible to follow the latter vessels to their terminal passage into a lymph gland, we may assume, from analogy of the inner drainage of the gingiva, that they empty into the deep cervical glands or in part to the submaxillary glands."

As we shall show later, we can verify the correctness of this supposition; we have succeeded in injecting these lymph vessels in their entire passage from their exit at the infraorbital and the mental foramen to their entrance into the submaxillary glands (*Fig. 8*).

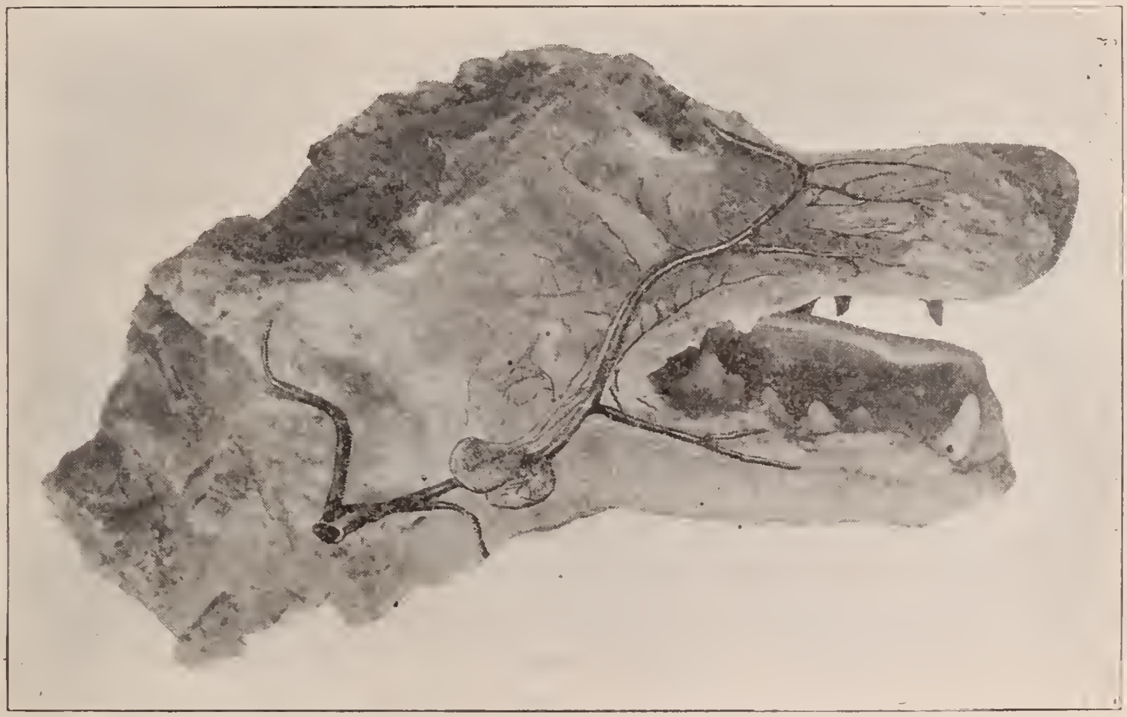

Fig. 8.—Drawing of dog's head showing injected lymph vessels from the infraorbital and mental foramina to the submaxillary lymph nodes.

The following is a table set up by Schweitzer, which shows the drainage of the different regions of the gingiva, demonstrated chiefly by the results of injections with differently colored injection masses. Although he warns that separation of the glands according to regional sources be made only with some caution, because of the possibilities of the anastomoses, he assures that clinical experience is entirely in accord with his experimental evidences. Of particular interest are the extensive statistical observations of Partsch[11] and Ollendorf[12] about the swelling of lymph glands in morbid conditions.

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[11] Partsch; Erkrankungen der Zæhne und Lymphdrüsen, Odontologische Blætter, 1899; Ein Beitrag zur Klinik der Zahnkrankheiten, Oesterr. Ztschr. f. Stomat., 1903. Die Zæhne als Eingangspforte der Tuberculose, Deutsch. med Wchnschr., 1904 30, 1428.

[12] Ollendorf; Ueber den Zusammenhang der Schwellungen der regionæren Lymphdrüsen zu den Erkrankungen der Zæhne, Ztschr. f. Zahnheilkunde, 1988.

REGIONAL DRAINAGE OF LYMPH VESSELS (OUTER LYMPH PATHS)

From the Region of:	Upper Jaw into Submaxillary Lymph Glands			Lower Jaw into Submaxillary Glands		
	Anterior	Median	Posterior	Anterior	Median	Posterior
Incisors and canines	Only exceptionally one vessel	About $\frac{5}{6}$	Almost $\frac{1}{6}$	About ⅓	About ⅓	Occasionally
Premolars	0	About ⅔	About ⅓	Rarely one vessel	Almost all	0
Molars	0	Almost ½	A little more than ½	Occasionally one vessel	Almost all	Occasionally one vessel

This picture of the lymph system of the gingiva, the peridental membrane and the dental pulp will be more complete if it is seen in its relation to the blood supply. Wedl[13] was the first to demonstrate and accurately describe the location, general arrangement and course of the blood vessels in this region. Schweitzer has added some interesting features, especially about the vessels of the dental pulp. At the apex, between the dense fibres, we find a loose connective tissue which surrounds the larger vessels and nerves. Such loose interstitial connective tissue also fills the spaces between the bundles of fibres of the peridental membrane, in which course the numerous blood vessels which ascend from the depth of the alveoli toward the gingiva. These vessels communicate with the vessels of the pulp, with those of the medullary spaces of the alveolar wall and with the vessels of the gingiva. Near the surface of the tooth there are long capillary loops; these become narrower toward the apex of the tooth and the neck of the tooth. The arrangement of the capillaries in the peridental membrane is quite unique. Both Wedl and Schweitzer describe peculiar round tufts of loops which Wedl was the first to compare with the glomeruli of the kidney, a resemblance which Schweitzer emphasizes in his illustrations, in which an actual connective tissue capsule around these tufts can be distinctly seen. Besides these singular formations there are capillary loops "en palissade." The peculiarity of this vascular arrangement is explained as a conformation due to unusual functional demands on a tissue of such structural and physiologic significance as is the case of the peridental membrane.

As to the dental pulp, Schweitzer insists that the number of vessels is greater than is usually given. The arteries entering the pulp divide into several parallel branches, which run toward the coronal extremity, giving off lateral branches mostly at right angles. These minute twigs form a precapillary network from which a very fine capillary network arises, located at the surface of the pulp between the odontoblasts. There are analogous venous networks; the veins leaving the pulp chamber are larger in number than the arteries. Being compressed at the apical foramen, the vessels in passing out spread out in rays, or fan-like. Even when still within the pulp cavity at the foramen where there is only cementum, divisions of the pulp vessels may branch off at obtuse or right angles, and pass through the cementum to gain the peridental membrane. De Saran[14] asserts that he has seen this very frequently. In previously published work[15] we reported that we have indisputably demonstrated that the lymph vessels of the dental pulp can be injected, not only in a retrograde direction by way of the gingiva, as Schweitzer did, but also by forcing the injection mass through the tooth directly into the exposed pulp tissue. The first investigation was limited to a study of the lymph supply of the pulp. The purpose of the present work was to follow the course of the outflowing vessels, to examine the extent of their communications with neighboring tissues, and to study their course in the mandibular and infraorbital canals, in short, to fill out some gaps left in Schweitzer's results.

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[13] Wedl; Pathologie der Zæhne, 1870, p. 37. (The later record by Metnitz and Wunschheim, Leipzig, 1901, 1, is not accessible.)

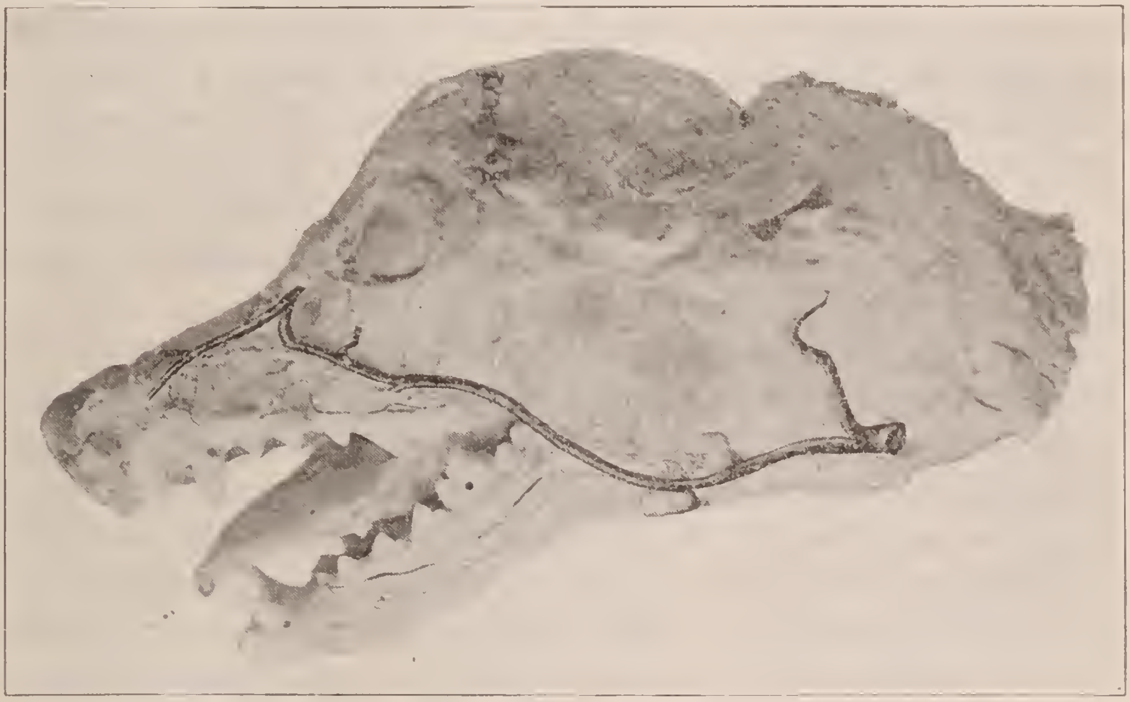

Fig. 9.—Drawing of dog's head showing injected lymph vessels from the infraorbital and mental foramina to the submaxillary lymph nodes.

The injections by the direct route offer numerous difficulties, as was pointed out in our former article. A successful injection, that is, filling of lymph vessels with the injection mass from the dental pulp throughout their entire course to their entrance into a lymph gland or lymph glands, such as shown in *Figure 8*, is a great exception. We see here lymph vessels, injected solely through the canines and first molars, emerge from the infraorbital and mandibular canal and pass to the submaxillary glands. The technic is to drill a hole through the tooth to the pulp, to insert a metal cannula with a hollow point, drop some Prussian blue into it, and force this fluid into the pulp tissue with gentle pressure. We used young dogs almost exclusively. It is evident that a small dog or any young dog with small teeth is not suitable for such injections; the holes are too shallow to keep the cannulas securely in place. The control of the pressure is by no means easy; too high pressure will drive the fluid into blood vessels or force it out between the cannula and the hole. However, leakage under pressure around the inserted cannula was considered a desirable valve of escape; we could assume that although much of the fluid was being expelled, a small portion would be driven into the pulp. We admit that the larger number of injections by the direct method were failures, at least so far as injection of vessels much beyond the pulp cavity was not obtained. For details with regard to the preparation of the fluid and the technic of injecting, we refer to our former article.

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[14] De Saran; Vaisseaux sanguins des racines dentaires, Gaz. med. de Paris, 1880, No. 48, p. 736.

[15] Noyes, F. B., and Dewey, K. W.; A Study of the Lymphatic Vessels of the Dental Pulp, *Dental Cosmos*, 1917, 59, 436.

For injections of the Gerota method we employed ordinary fine steel needles with a Luer syringe instead of the finely drawn out glass cannulas which are recommended for this method. After the needle had been pushed forward into the tissue, keeping as close to the bone as possible, it was retracted a little in order to diminish the tension of the tissue; the fluid was now slowly injected, while gentle massaging was done with a finger of the other hand. After the needle was finally withdrawn, massage was continued with greater pressure for some time. Subsequently the blood vessels were injected with carmin gelatin.

The results from such injections are not uniform; the microscopic pictures one obtains are often disappointing. There may be a very rich supply of well injected lymph vessels with the blood vessels too poorly demonstrated to refute the argument that some of the supposed lymph vessels may be blood vessels. *Vice versa*, with a successful injection of the blood vessels there may be an unsatisfactory injection of the lymph vessels. This is an experience which even such an expert as Bartels admits that he had. This author states that in spite of all his efforts he never succeeded in filling lymph vessels and blood vessels at the same time; "it seems that one excludes the other (compression)." Sometimes an originally good injection of the blood vessels is subsequently spoiled in the process of decalcification and celloidin embedding. The failure to obtain always indisputable results illustrates the difficulty of injecting a tissue which can be reached indirectly only. The relative inaccessibility of the peridental membrane is probably the reason why injections have not been attempted long ago. However, this has not deterred anatomists from admitting the existence of lymph vessels in this tissue. Testut,[16] in referring to them, takes it for granted that they exist and simply records that they are not yet known. The more astonishing is a statement by Hopewell Smith[17] in a recent publication that "a lymphatic system in the peridental membrane exists only in the imagination of incompetent observers." Logically we must assume that lymph vessels are present wherever there are blood vessels, even in the complete absence of positive evidence. There is nothing so strikingly unusual in the anatomy of the peridental membrane as to justify the assumption of entirely exceptional conditions. This tissue is directly continuous with the tissue of the gums and with the medullary spaces of the jaw bone, and it is absolutely illogical to suppose that the circulating lymph of the neighboring tissue should cease abruptly at the tissue composing the peridental membrane.

There are no indications in the literature to show that injections of the lymph vessels of the peridental membrane were attempted until the work of Schweitzer, who reported his results in 1909. On the other hand, reports of clinical observations of lymph vessels in this tissue are not so very scanty. They refer to statements concerning the relations of glandular swelling to inflammations about the teeth. Ollendorff[18] reports that practically all cases of periodontitis are accompanied by lymphadenitis; in only three out of twenty-two hundred and forty-six patients with periodontitis was enlargement of the glands not detected. Partsch[19] states that lymphadenitis belongs to the clinical picture of peridontitis. The extent and course of the glandular swelling corresponds exactly to the local process; the more intensely peridontitis sets in, the more acute is the lymphadenitis; in chronic inflammations of the peridental membrane periostitis, fistulas, pus formation, etc., the inflammatory changes of the glands also reveal the same chronic character. In reports from other writers[20] the relation also of pulpitis to glandular swelling has been given weight.

Lymph vessels from the peridental membrane and those leaving the pulp through the apical foramen pass through the spongiosa of the jaw bones and enter the mandibular and infraorbital canals, which they leave in company with the blood vessels and nerves at the mental and infraorbital foramina. In this respect we have been more successful than Schweitzer who, it is true, demonstrated that lymph vessels are actually present within the mandibular canal, but was unable to fill them throughout their entire course; he could not follow them at their exits at the mental and mandibular foramina. To him the incompleteness of the injection, however, was of significance, so far as it was an evidence that the injection mass in the lymph vessels within the canal had not been carried to them from without, but from vessels of the peridental membrane by way of the spongiosa. Ollendorff, in his publication seven years before Schweitzer, reported that twice in the course of his injections of the lymphatics of the lip he saw that fine lymph vessels enter the mandibular canal through the mental foramen externally from the gingiva. Although the accuracy of this observation was questioned by Polya and Navratil[10], there is the report of interesting clinical observations by Partsch[21] which corroborates Ollendorff's assertions. In two of the cases of invasion of carcinoma of the lip into the lower jaw, which this author investigated, the tumor had followed the mental and alveolar nerves and invaded the mandibular canal, where it proliferated and expanded the bone.

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[16] Testut; Traite d'Anatomie humaine, Paris, 1912, 4, 37: "The lymphatic vessels, supposing they exist, are not yet known, to us" (les vaisseaux lymphatiques, si tant est qu'ils existent, ne nous sont pas encore connus).

[17] Smith, Hopewell; On Healthy and Diseased Conditions of the Alveolar Processes of the Jaw, *Dental Cosmos*, 1918, 60, 426.

[18] Ollendorff; Ueber den Zusammenhang der Schwellungen der regionæren Lymphdrüsen zu Erkrankungen der Zæhne, Monatschr. f. Zahnheilk., 1898, 16, 249.

[19] Partsch; Erkrankungen der Zæhne und der Lymphdrüsen, Odontolologische Blætter, 1899, 4, 63; Ein Beitrag zur Klinik der Zahnkrankheiten, Oesterr. Ztschr. f. Stomat., 1903; Die Zæhne als Eingangspforte der Tuberculose, Deutsch. med. Wchnschr., 1904, 40, 1428.

[20] Kœrner; Ueber die Beziehungen der Erkrankungen der Zæhne zu den chronischen Schwellungen der regionæren Drüsen, Berlin, 1897. Odenthal: Caribœse Zæhne als Eingangspforte bei infektiœsen Halsdrüsenschwellungen mit kariœsen Zæhnen, Beitr. z. klin. Chir., 1896, 16.

We consider our successful injections of lymph vessels within the infraorbital and mandibular canals a needed addition to the scanty evidences just mentioned. A surprising feature of our cross-sections of these canals is the wealth of the lymph supply. Since the study of this, however, is inseparably linked with that of the blood vessels and nerves, it may be proper to review briefly the blood and nerve supply. The writings of Zuckerkandl[22] and Bochdalek[23] are good sources of information on this subject.

The arterial blood supply is derived from the internal maxillary artery. The chief vessel for the upper jaw is the superior alveolar artery. The branches of this main trunk run, in company with the dental nerves, within the canals of the maxilla toward the anterior portion of the bone, where the largest of these vessels joins the anterior superior alveolar artery, a branch of the infraorbital artery. The anastomosis of these two vessels forms a large arterial arcade from which branches go off to the lateral teeth, while the anterior superior artery which, accompanied by the anterior alveolar nerve, runs inward and downward, supplies the front teeth. Within the mandibular canal the inferior alveolar artery lies inside of the nerve. Branches go off at the alveolar processes. The main trunk passes out of the mental foramen and continues its course into the lip, after having given off the anterior or incisor branch which, in company with the interior or incisor nerve, goes to the median portion of the jaw. All the small arteries are, like the main trunks, accompanied by nerves. There are two main sets of these smaller vessels, namely, the dental arteries proper, and the inter-alveolar arteries. The latter are relatively large. They surpass in width the dental vessels. They run within the porous portion of the alveolar walls to the edge of the alveolar process and on their way give off numerous twigs to the peridental membrane and the jaw. At the border of the jaw, branches of the inter-alveolar arteries penetrate through spaces in the bone substance to the surface and are distributed in the gingiva as rami perforantes gingivales. Another system of branches of the same artery passes through openings of the lateral alveolar wall into the peridental membrane.

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[21] Quoted by Schweitzer (Footnote 1).

[22] Zuckerkandl; Scheff's Handbuch der Zahnneilkunde, 1909, 1, 108.

[23] Bochdalek; Untersuchungen der Nerven des Ober-und Unterkiefers, Med Jahrb. d. k.k. oesterr. Staates, 1855, 19.

A characteristic of the veins in the canals of the jaw, as in other rigid canals, is their tendency to form plexuses around their arteries. Even the large inferior alveolar vein in the mandibular canal breaks up into a dense plexus which winds around and about the artery, while the larger branches run parallel with the main artery. Zukerkandl advances an explanation for this arrangement: In systole of the artery the blood is withdrawn from the capillaries, and the venous plexuses are filled and now occupy the space between the relaxed arteries and the wall of the canal. The diastolic artery, on the other hand, presses on the peripheral venous plexus and aids thus in emptying it. This mechanism assists the circulation in the venous system, and at the same time the artery is made independent of the restrictions of the bony wall.

DISCUSSION

DR. EUGENE S. TALBOT, Chicago: Twelve years ago Dr. Latham and I did some work on dental pulp, but not in relation to the lymph channels. We were astonished at that time because of the large number of abscesses that form in the dental pulp. It is almost impossible to believe that abscesses form in the dental pulp without causing any pain, and later heal up, which naturally would show that there must be lymphatics connected with the dental pulp. It was not until Dr. Rosenau showed how the streptococcus travels through the blood stream into different parts of the body that it was fully explained how these germs pass through the ends of the roots into the dental pulp and form abscesses. We have on record one case, which was a wonderful illustration of the abscess theory. This pulp shows an abscess forming, another one healing and one practically ripe with the pus inside of it, showing the different changes that had taken place from the time of infection to the healing of the abscess in the dental pulp. If one makes a study of the dental pulp with a view to looking into this abscess formation, he will find a great many scars in the dental pulp where abscesses have formed and healed.

DR. EDWARD H. HATTON, Chicago: These pathologic changes which are found about the gingivæ and in the regions adjacent to these pus pockets can be explained in no other way than by the presence of lymphatics in the peridental membrane leading down along the teeth and into the pulp cavity.

DR. HERBERT A. POTTS, Chicago: Aside from the histologic and anatomic interest of these studies, the demonstration explains many of our brilliant successes and many of our failures in the induction of local anesthesia. Two years ago Dr. Noyes told us the difficulty by which these injections were attended. I am sure that most of my success is due to the technic of the injection itself. Only by slow, steady injection do you obtain results.

DR. FREDERICK B. NOYES, Chicago: I think you will find that this work has a bearing not only on local anesthesia but on the whole realm of dental pathology, especially the destructive inflammations which have their origin in the gingival spaces.

REMOVABLE APPLIANCES.*

BY F. EWING ROACH, D.D.S., CHICAGO, ILL.

PROFESSOR OF PROSTHETIC DENTISTRY, CHICAGO COLLEGE DENTAL SURGERY

I ASSURE YOU it is somewhat encouraging to me at this time to be with you and talk to you on the subject after such a flattering introduction as has been tendered me by your worthy president. I assure you I do not deserve any such introduction.

However, we are here to talk to you about this very important subject of Removable Appliances. The title given my talk is that of "Removable Bridge Work." This title properly is not as it should be. I do not like to limit the scope of my work to removable bridge work. I believe it should cover a vastly larger field. As a matter of fact removable bridge work has comparatively a limited application, as compared to what might more properly be called partial plate work. The great drive in the past few years upon focal infection and the complications of pulp-canal treatment have compelled the dental profession to cast about for better means of supplying these missing teeth, and to employ a more conservative practice with reference to the destruction of the natural teeth and their pulps. It has driven the prosthetist to improve his methods of supplying these missing teeth. It is to this particular kind of work that I intend to direct my remarks this afternoon. I am sure that you all will agree with me that the successful substitution of lost natural teeth should be so that they compare reasonably well with the natural teeth in efficiency and comfort to the patient. That is one of the difficult problems that we are confronted with, and in view of the fact that we are compelled to limit the destruction of the dental pulp, the complication of supplying these missing teeth is very much exaggerated. We must do more partial plate work. We must do better partial plate work than we ever have done in the past. We have been in the habit for the past quarter of a century or more of supplying these missing teeth in the great majority of cases by means of one of two methods, viz.: fixed bridge work and ordinary partial plate work. We have carried the practice of fixed bridge construction to the extreme; we have abused this splendid method of supplying the lost organs; we have carried this method of supplying these teeth to such an extreme, and have been so careless in the construction and so careless and indiscriminate in cases by ruthlessly destroying the teeth and the pulps, that American dentistry has been disgraced in the eyes of the world. Now, then, it is not because fixed bridge work has no place in our practice; there is no better means whereby we can supply missing teeth in the human mouth than by properly-constructed, fixed bridge work. I am a believer in fixed bridge work, because, as I say, I still believe that it has a place, and as Dr. Orton said this morning—and I was very much pleased to hear Dr. Orton make this statement—fixed bridge work has a limited and very limited place in dentistry today. And coming from a man such as Dr. Orton, a man that I know does the highest type of fixed bridge work, I feel that I can take this from him as being a very conservative statement. My belief is, then, that we must make an effort to do better, make better removable appliances, be more careful in the selection of the kind of an appliance we are going to make, study the cases that come to us more than we have in the past, analyze the cases, and then choose very carefully between the great variety of means that we may resort to to supply these missing teeth.

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*Stenographic report of a lecture delivered before the Indiana State Dental Association, June, 1918.

You all have heard a great deal in the last two years about the difficulties of filling root canals, the complications you know from experience, the uncertainties of these posteriors. I believe and I feel today that personally I am in a position to say, that a very small per cent. of the cases that come to us for restorations require the removal of pulps adjacent to spaces in the mouth, in the replacement of those teeth with appliances that will be equally efficient, equally comfortable to the patient as the best type of fixed bridge work that can be made. My life's work, if such it may be termed, has been directed to a conservation of the natural teeth in supplying these missing teeth; not that I had any knowledge of the dangers of the removal of pulps and the destruction of the natural teeth; not that I had any knowledge, as I say, of what danger I was taking by doing those things, but I have had a feeling all the time that it was wrong. Probably it was that disposition to want to avoid this difficult task of removing pulps and filling these pulp canals. I never have felt safe in that procedure. I never have felt when I did that operation that I had done work that I could depend upon. I never was sure that that tooth was not going to give my patient and myself trouble. So that as I say, I did not avoid the mutilation of those natural teeth by reason of any knowledge that I had that would damage their being there, but I have had a feeling down in my heart that it was wrong to mutilate a natural tooth for the sake of putting in a fixed appliance. I always have practiced and approved the conservation of the natural organs, and I believe today that I am in a position to say that I am personal in my own use of the methods that I propose to bring to your notice, that I am able to supply a great majority of these teeth in a way that is manifestly satisfactory.

Now, we have in the past been supplying these missing teeth by means of fixed bridgework or by ordinary partial plates. We have made a great many fixed bridges that we should not have made, and we have not made them as they should have been made. We have abused partial work in the same way and between the two evils the patients have chosen the fixed bridge, to his detriment, no doubt. We have made fixed bridges many times when we were satisfied in our own minds that it was not indicated, for the reason that we could make our bridge and supply the missing teeth with an appliance cemented to place, so that the patient would have to wear it regardless of how poorly it was done.

The public is becoming educated and is demanding a better service. The medical profession has been responsible to a certain extent for this change, and we must give the medical man credit to a considerable extent for this campaign of education.

Another question, in addition to those already referred to, is that of fees. One of the reasons,too, that the profession has made use of the fixed bridge to a larger extent that it should have, has been due largely to the fact that the fees have been a little better. That is a lamentable state of affairs, and it is one I refer to with some embarrassment. But it has influenced a great many to place fixed bridge work when partial plates well made would have been a great deal better for the patient. My contention is that we must make our removable appliance with greater care, and if the fee must be considered, I am sure with all things considered the removable appliance can be supplied in average run of cases for an equal compensation. The ordinary plate as constructed by a dental laboratory made from models that are sent to the laboratory by the dentist, is bound to result in a poorly-constructed and ill-fitting appliance. I regret very much that we have as a profession gotten in the habit of sending our appliances away to dental laboratories for their construction. Dentists have neglected this work and have depended upon the laboratory entirely too much. I have no grievance against the dental laboratory. The dental laboratory man, as a rule, is a splendid workman if given the proper assistance by the dentist; he is a great help to us; we have need for the dental laboratory, but the point I want to make in this connection is this: If we are going to make removable appliances that are as efficient and as comfortable to the patient as fixed bridge work, we cannot do it by means of the procedures that are being followed generally by taking an impression of the mouth and sending that impression to the dental laboratory with instructions to construct such an appliance of this or that or the other type of construction and expect that appliance to be what it should be. I maintain this is a physical impossibility. It cannot be done. You can take a good impression of the mouth, if you get a good impression, and by the assistance of the laboratory man have your plate made and your teeth set up and carried back to the mouth, study the arrangement of the teeth and follow them back and forth by several exchanges of efforts you can get reasonably good results. I am making a plea for more individual effort, more individual attention to our partial-plate construction or our removable bridge construction, if you please. Now, I am not going to spend any time at all in my talk this afternoon upon the more elaborate complicated systems and methods of removable bridge construction, for the reason that these more complicated methods that are being used by a selected few of the profession have such a limited field that I do not intend to touch upon the use of them at all. The great majority of us are not called upon to do this type of work. These complicated systems have a place, they have a field in the hands of the conscientious, careful practitioner who has a class of patients who can afford them.

But what I shall devote my efforts to this afternoon is a class of simple procedure for the ordinary mass of cases that concern us in the hands of the average practitioner, that we may better supply teeth for this great, large majority of cases that need teeth, supply one or two teeth, from one to as many teeth as may be needed, and especially in mouths having sound natural teeth to which anchorage is to be made without devitalizing, and in the majority of cases without mutilating the natural teeth in supplying them. Now, there are scores of cases that can be supplied reasonably well by means of the ordinary plate. But unfortunately for us a great many of these cases that we think, and that the patients have told us are all right, are not all right. I have had a number of cases in my own practice in which I have made partial plates, and the patients would come back year after year, and say, "That is fine. It serves my purpose and it is very comfortable." I have learned to know that they are not right. I see cases that I constructed in my earlier practice that I know are not all right because they damaged the natural teeth and tissues. So it is not always a proof that a case is a success because the patient thinks so. My plan now in the construction of these partial cases is to take good impressions and take them in sections. I believe that it is impossible to make a partial plate from an impression taken of the mouth in its entirety, and construct an appliance, either by cast or swaged gold, vulcanite, or any material and secure accurate results

Let us not be satisfied with that type of an appliance. Now, then, I am offering this plan of procedure for the reason I am satisfied that it will give more accurate results, and that is what we want. It takes a little more time, I will grant, but in my experience the time that is spent taking these impressions in sections and making my appliance in sections, and fitting these sections as I go along, fitting them to the patient, is a great deal better than to spend an equal amount of time, and possibly a good deal more time, after the case is finished trying to fit the patient to the appliance. That is what we have been doing. I am making a statement with some considerable emphasis from a very extensive experience and observation because I have the opportunity of seeing hundreds of cases in a large college clinic. In order to carry out the technic that I shall outline to you it requires that we make these appliances with gold-saddled construction, and I want to make as strong a plea for the use of the gold saddles and gold saddles in combination either with vulcanite or with the porcelain teeth fitted direct to the saddle without the use of vulcanite, as possible. The best construction for removable appliance is that it is almost necessary, in my judgment, to use a gold saddle in order to carry this subject by special procedure that seems to me so necessary in order that we may have co-ordination. If we do not get co-ordination between the hard and soft areas of the teeth, we are going to load strain on the soft tissues or we are going to load unnecessary strain on the teeth, so by means of a gold saddle, as a support for the teeth, we can secure a higher degree of success. Now, I know it is always said that the majority of people cannot afford gold, that we must use vulcanite in most of these cases. I do not believe it. I did believe that for a long time, but I do not believe it any more. Why do I not believe it? I have proven that it is not so. I have proven that in the college clinic where we have the poorest possible class of patients. These people, a great many of them, a surprisingly large number of them, are willing and able to pay for a better service. All that is necessary I believe in the majority of instances is to prepare ourselves for rendering a better service, and it will not be hard to convince the patient that that better service is worth more money, and they are willing to pay the difference. Assuming that we are going to make a removable bridge over a space from a cuspid to the molar supplying three or four teeth, is it possible to take an impression of that surface or any one impression and make a successful removable appliance for it? I do not believe that it is. Personally I cannot get results that are satisfactory to me, for the reason that in the first place I want the clasp on the teeth so accurately fitted and so rigidly attached to those teeth that they are as accurately fitted as my best inlays or crowns. I want that clasp on those natural teeth to carry possibly the greater part of the load and stress of mastication. I do not intend that the alveolar ridge shall carry the load. My experience is that in all these small cases, all these removable appliances that depend upon a small narrow area, are not very efficient. People will get used to them, as I say, and get along and say they are all right, but you put in one of the appliances such as I refer to and they will tell you there is a difference.

Wabash Ave. and Madison St.

CONDUCTIVE ANESTHESIA AND EXODONTIA.*

BY D. P. SNYDER, D.D.S., EXODONTIST, COLUMBUS, OHIO.
Instructor in Exodontia and Radiography, Dental Department, Ohio State University

WE ARE INDEED living in a nervous, hysteric and competitive age and our patients daily become less fit to tolerate pain which their ancestors bore with ease.

This demands from us the abolition of pain in dental operations, if we would conscientiously heed the cry that has gone forth so loudly within the civilized world within the last decade, "save the human teeth." For who would deny that the destruction of these most essential, most vital organs in the human economy, has assumed most alarming proportions, and that we dentists, if we really wish to live up to the importance of our profession in regard to social economy, must have recourse to all possible means to inhibit this universal disease?

Thus, the plea for efficient dentistry becomes identical with that for humanitarian dentistry. It behooves the ethical dentist to make his operations painless by mastery of anesthetic technic, thereby competing successfully with a most unfair competitor (the quack), saving his patients' nerves, incidentally, also, his own, and banishing forever that dread and fear of the dental office which seems to inhere most persistently in the vast majority of patients, and which is in a large measure responsible for the appaling ravages of dental caries in all classes of civilized society.

The advantages of N_2O and O anesthesia in the routine practice of the exodontist, after having been tested for decades, needs no introduction. In certain specialties of dentistry, however, notably the operative branch, in which efforts have been made to combat pain by the application of N_2O and O analgesia, a reverse of the tide has been experienced, and a great many practitioners have been inclined to disparage its value.

It may not be amiss once more to emphasize the fact that successful, safe, and expedient exodontic practice could hardly be carried out successfully without the benefit afforded by this technic.

Any one familiar with the daily application and the administration of this form of anesthesia knows that there is no safer, more convenient and practical general anesthetic available.

(*The writer wishes to make grateful acknowledgment to Dr. R. H. Riethmueller for suggestions in the preparation of this paper and quotes in part from Thoma, Braun and Riethmueller.)

Patients of highly excitable, neurotic temperament, especially appreciate this means of being relieved from one primal instinct—fear. To them N_2O and O anesthesia appears as a blessing that relieves them from any extraordinary efforts of will, or the extremely untoward results of mental and surgical shock.

It is the highest and lowest types of patients who regard the artificial induction of sleep as a most blissful means of passing through a surgical experience—that is, an extraction—which by the overwhelming majority of laymen is still looked upon as one of the most disagreeable experiences and one of the most regrettable manifestations of the weaknesses to which the human flesh is heir.

While we acknowledge all of the wonderful benefits accruing from this anesthesia, we would be remiss in our duty toward the patient were we to proclaim N_2O and O anesthesia as suitable in every case in exodontic practice. It repeatedly has been acknowledged by men of the widest experience in its administration that this method, in certain cases, entails certain difficulties, and indeed contra-indications, which militate against its routine application in every case. Men familiar with it are not over-enthusiastic about experiences with patients of alcoholic or drug habits, with cardiac, diabetic, arterio-sclerotic, nephritic and tubercular conditions.

In the mind of the conscientious operator there looms always a fear that there may be present in a patient who is in apparently perfect health, with normal pulse and respiration, a hidden aneurism, which, under the inevitable rise of blood pressure, may give way and terminate the life of the patient who is doomed anyway, sooner or later, under circumstances apparently incriminating the operator. Upon the other hand, it is the natural ambition of every exodontist whose aim it is not only to get the tooth out but to perform a clean surgical operation, to apply his surgical skill in such a manner that the patient's interest will be best served, and that the operative dentist, the crown and bridge worker, and especially the prosthodontist, have their patients return to them exhibiting a condition of the mouth favorable, in fact, ideal under the circumstances, for proper restorative measures.

There are a great many cases in which the exodontist would have to prolong the N_2O and O to such an extent as to invite consequences detrimental to the patient's systemic health. Crile has convincingly demonstrated that prolonged general surgical anesthesia entails the destruction of a certain number of cells of the brain, of the adrenals, and of the liver, and the conscientious anesthetist should employ every means to counteract the risk of shock by the selection of the anesthetic most suitable to the patient's social, mental and physical status. There are patients to whom the idea of being put to sleep by artificial means is equivalent to the risk of life; others will suffer for an inordinate length of time from post-operative nausea and shock. Others, again, present a condition requiring surgical intervention of prolonged duration of such a nature as to render the application of a general anesthetic impracticable and contrary to the best surgical judgment. It is in these cases that the patient's interest and the operator's efficiency are best served by the application of conductive anesthesia.

The adoption of local anesthesia by novocain, which for many years has been practiced generally in Great Britain, has been especially dilatory and cautious in the United States, seemingly for three reasons: *First,* the injudicious employment of cocain and proprietary secret cocain preparations by unethical painless dentists, which have inspired the public and the ethical practitioner alike with a fear of the utilization of that treacherous alkaloid; *second,* frequent failure due to the lack of appreciation of the physiological and anatomical relations upon which all methods of this specialty are based, and of the imperative necessity of asepsis of solution, apparatus and the region to be anesthetized; *third,* a partiality to general anesthesia, apparently justified by the remarkable development of N_2O and O anesthesia and analgesia in this country.

The relative merits of N_2O and O and novocain-suprarenin local anesthesia, however, is close at hand, since local anesthesia has, within recent years, found enthusiastic advocates among both the medical and dental professions, as men like Crile and Mayo.

The increase in popularity of local anesthesia over general anesthesia is due, besides its incomparably greater safety, absolute certainty of insensibility, and facility of operating, to three factors:

First: The admixture of suprarenin preparations to the anesthetic solution, by which absorption of the anesthetic into the circulation is retarded, the depth of anesthesia is increased, and anemia in the field of operation is insured.

Second: The substitution for cocain of far less toxic, more stable and uniformly effective, sterilizable, and non-habit forming synthetic products, among which novocain is given preference.

Third: The perfection of the method of infiltration and conductive anesthesia.

The simplicity of the technic of infiltration and conductive anesthesia is within the reach of any one familiar with the anatomic relations upon which it is based.

The quality and duration of the anesthesia obtained are such that the most complicated and extensive surgical operation can be performed without the patient experiencing any pain whatever, and with a certainty that the first acute post-operative pain will be relieved by the anesthesia which persists for an hour or two following the operation. There is no danger of the patient swallowing blood or fragments of tissue, and any change in position which may be helpful to the operator can be executed readily by the patient himself, as he is not deprived of any of his mental or motor faculties except the sensory perceptions within the blocked area. The patient leaves the operating chair without the necessity of resting, or administrations toward resuscitation, and can be given full and clear instructions as to the post-operative treatment by which he may himself hasten the healing process or render it uneventful.

REQUIREMENTS OF AN IDEAL LOCAL ANESTHETIC.

First: The substance must be less toxic than cocain.

Second: The agent must not cause the slightest irritation or tissue injury but must be absorbed from the place of application without any secondary effects, such as severe hyperemia, inflammation, painful infiltration or necrosis. Only when these conditions are fulfilled can we assume that the healings of wounds will not be interfered with.

Third: The agent must be soluble in water and its solutions stable and possible of sterilization by boiling.

Fourth: It must be possible to combine the agent with suprarenin without interfering with the vaso-constrictor power of the drug.

This list represents a severe condemnation of cocain and its admixtures. With the rapid extension of the use of cocain and its admixtures, certain disadvantages became apparent; pronounced toxicity, and the fact that cocain solution cannot be sterilized by boiling.

The symptoms of cocain intoxication in cases of idiosyncrasy are truly formidable, the effect of this drug on the heart, nerves, and the kidneys are very undesirable. Moreover, the habit-forming property with its sinister sequelæ of pathological and moral degeneration reveals such a serious aspect that even legislative measures had to be invoked to protect society against cocainism.

As the chemical nature and its physiological action became understood the next aim of research was to produce a synthetic preparation possessing the anesthetic properties of cocain without the disadvantages attending its use. A great many cocain substitutes and admixtures are highly toxic, they have other untoward properties and generally produce hemolysis of the human blood corpuscles. The large majority of these drugs are proprietary preparations.

From a merely practical point of view it should be remembered that the price of these proprietaries is too high in comparison to their efficiency, and the mystery in which the manufacturers shroud the composition of their products, puts the operator at a great disadvantage medico-legally in case of suit for damage following any accident.

An antiseptic strong enough to keep the solution stable will result as a tissue irritant. Pharmacologists and chemists have discovered that an ideal local anesthetic can be synthetically prepared, the diethylaminoethanol-ester-p-amido-benzoic acid, or novocain, being the most satisfactory.

It lies outside the scope of this paper to repeat the anatomic description of our field, except to touch upon a few of the most important points which will be explanatory to my clinic. Any textbook on anatomy or local anesthesia will offer ample information on this subject.

INFILTRATION.

The maxilla, owing to the liberal distribution of the cancellated areas throughout its superficial cortical layer, both facially and palatally, lends itself most favorably to infiltration anesthesia, allowing the ready anesthetization of each individual upper tooth, at any age.

In the mandible, the cortical layer prevails, increasing in general distribution and density with the advance of age, so that infiltration anesthesia is uniformly successful only in children up to 12 years of age, while in persons above 12 years this method is applicable only for the anesthetization of the centrals and laterals, the osseous environment of which to some extent retains its cancellated character.

The mandible, therefore, may be said to be the field par-excellence for conductive anesthesia, especially since it is difficult to make an injection in the lingual surface, owing to the continuous interference by the tongue and the continual inundation of the field of injection by saliva from the sub-lingual gland.

Infiltration anesthesia is best accomplished by using the needle 23 mm. After some practice, the operator will acquire sufficient skill to enable him to use a longer needle.

The point of injection is half way between the cervical margin and the probable root apex of the tooth, mesially to the long axis, as nearly at right angle as possible to the bone. After a drop is injected the needle is pushed forward as the field becomes anesthetized, keeping in contact with the bone until the apex is reached. The advance of the needle must be very slow, else a wheal or balloon will rise. If this occurs, it must be distributed immediately by the index finger.

The description just given of the technic of infiltration anesthesia applies to anesthesia for dental purposes, the extirpation of the pulp, excavation of hypersensitive dentin in cavity preparation, and the preparation of vital abutments in crown and bridge work.

This labial or buccal technic anesthetizes the nerve leading to the tooth, the alveolus, the pulp of the tooth injected, and the periosteum of the labio-buccal side. In order to obtain complete surgical anesthesia, sensation in the palatal and lingual and mucous membrane, and periosteum as furnished in the maxilla by the posterior and anterior palatine nerves respectively, and in the mandible, the lingual nerve, must be abolished.

Infiltration anesthesia is by no means easier than conductive anesthesia. The injection requires a much longer time, liability to causing some pain and tissue lesions, hence after pain. Moreover, the danger of injecting into a hidden focus of quiescent chronic infection is ever-present. Therefore, rather than run the risk of spreading such local infection, conductive anesthesia should be resorted to in cases suspected unless a roentgenogram guarantees the presence of normal tissue.

While infiltration anesthesia is essentially of a terminal or peripheral nature, conductive anesthesia aims to intercept or block at a convenient point a sensory nerve before it reaches and distributes itself in the area which its branches supply. For our purposes, fortunately, it is unnecessary to carry our solution directly into the nerve trunk, since the nerve branches in our special field are slender enough to absorb and conduct the novocain and suprarenin solution.

Our solutions are laid in the vicinity of the foramen with a liberal superlayer of fatty connective tissue to which the nerve as well as any blood vessel have ample space to escape unless the needle is inserted with an unduly fast stabbing motion.

BRIEF DIRECTIONS FOR CONDUCTIVE ANESTHESIA—FORAMEN—ANATOMIC LANDMARKS—ADVANCE OF NEEDLE—QUANTITY OF SOLUTION.

Maxilla: Zygomatic Surface. The posterior and middle superior dental foramina located upon the zygomatic surface giving passage to the posterior and middle nerves, innervating soft tissues facially, bone and pulp of the first, second, third molars, and first and second bicuspids.

The needle is inserted in the reflection of the mucous membrane over the molar teeth and advanced on bony surface, without discharging solution, in an upward and inward direction.

When the needle is inserted the full length, a deposit of the solution is made. If the bicuspids are to be anesthetized, 1 cc. of solution is discharged as the needle is withdrawn. Quantity of solution, 2 cc.

Infraorbital foramen, emitting anterior superior dental nerve, innervating soft tissue facially, bone and pulp of the central, lateral and cuspid: Palpate lower border of the orbit on face, press index finger over infraorbital foramen; needle inserted in reflection of mucous membrane distally to cuspid root; advance needle until felt by the finger, pressing the solution in the foramen while injecting. Quantity 1 cc.

Mandibular foramen, in the internal surface of the ascending ramus, giving entrance to mandibular nerve, innervating soft tissue in bone and pulps of all teeth from the third molar to central incisor. From first bicuspid to central incisor, however, innervating by anastomosis from the opposite side must be considered and abolished by injecting at mental foramen on opposite side. The index finger is placed in the post-molar or retro-molar triangle. Needle inserted about 1 cm. above the last tooth or the middle of the finger nail, in children lower, old age higher, barrel resting in the vicinity of the bicuspids on the opposite side. Needle is advanced whole length before injecting. Quantity 2 cc.

Mental foramen, located beneath and between the roots of the first and second bicuspid, gives exit to the mental nerve supplying the soft tissues of the chin and the mucous membrane of the lower lip. By pressing the solution into the foramen, anesthesia can be obtained from bicuspid to bicuspid. Quantity 1 cc.

The buccinator nerve supplying the buccal mucosa with sensory fibers sometimes remains sensitive after the mandibular injection. Insert needle in region of buccal of third molar and inject a few drops.

A FEW PRECAUTIONS.

If all requirements of asepsis in connection with the anesthetic solution, the instrumentarium, and the field of operation have been satisfied, no untoward sequelæ of any kind will follow the injection, if it has been made into healthy tissue.

Injection in close proximity to a purulent center must be avoided in all cases, since virulent bacteria may be carried into deeper layers. In cases of severe inflammation or abscesses, conductive anesthesia must be resorted to. Pain from secondary infection, due to faulty oral hygiene, must not be charged against local anesthesia.

PREPARING THE FIELD OF OPERATION.

Before making an injection in the mucous membrane, the mouth must be put into a sanitary condition as far as possible, or at least in the vicinity of the field of operation. The area around the prospective point of insertion of the needle is swabbed vigorously with a sterilizing agent, preferably Riethmueller iodin solution, which is composed of iodin ten parts, menthol ten parts and benzole U. S. P. 80 parts. Due to the tingling sensation of the solution the patient is not aware of the insertion of the needle.

Heretofore, very little attention has been given to the removal of all foci of infection from chronic and blind abscessed teeth or roots. The cystoid, if small, usually is attached to the root upon its removal, but if it is large it will rupture and remain in the socket to carry on its work of the discharging of toxins. These areas have been discovered by the Roentgenograms and are found to be destroying bone tissue for an indefinite period after the tooth has been extracted.

Unnecessary laceration and destruction of both soft and hard tissue delaying the reparative and restorative measures, irregular process, retained spicula, exposed process, all of which delay fitting of bridge work, not to mention how difficult it is to place partial or full denture over an irregular ridge. Lack of comfort from these dentures oftentimes hastens the patient to come to the conclusion that bridges and dentures were not properly fitted.

There are other advantages of local or conductive anesthesia in which plenty of time is given to examine each and every root for cystoids, or to carry on extraction where complication may arise, remove spicula, remove or protect exposed process, to cut away large interproximal septa, and remove any tissue where the circulation will be arrested.

Enough has been done in this field to show definitely that the method of local and conductive anesthesia as described can be employed with safety and success, and will be very valuable toward greater efficiency in dental practice.

Local and conductive anesthesia never was intended to replace general anesthesia but to supplement it. What we must guard against is a biased exclusiveness toward one method or the other, since the special indications determine the choice of the anesthetic from case to case.

In conclusion, I may say that conductive anesthesia by novocain-suprarenin injection surely deserves a thorough trial by every dentist, and it will prove a boon if the precautions mentioned are observed and the technic of injection is mastered. It always must be our aim to serve the best interest of our patients, and to make accessible to them the methods of combating pain most suitable to the individual case, and most certain to guarantee the best results.

Julius Stieglitz, Chicago, chairman, subcommittee on synthetic drugs, National Research Council, reports on Procaine and Novocain in *The Jour. Amer. Med. Association* as follows:

> "It appears that in certain quarters the attitude is taken that the local anesthetic sold as Procaine is not identical with that marked as Novocain. The subcommittee on synthetic drugs of the National Research Council believes important that this misunderstanding should be corrected and hence offers the following explanation:
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> "The monohydrochlorid of para-amino-benzoyl-diethyl-amino-ethanol, which was formerly made in Germany by the Farbwerke, vorm. Meister, Lucius and Bruening, Hoechst, A. M., and sold under the trademarked name 'Novocain,' is now manufactured in the United States. Under the provisions of the trading with the enemy act, the Federal Trade Commission has taken over the patent that gave monopoly for the manufacture and sale of the local anesthetic to the German corporation, and has issued licenses to American concerns for the manufacture of the product. This license makes it a condition that the product first introduced under the proprietary name 'Novocain' shall be called Procaine and that it shall in every way be made the same as the article formerly obtained

from Germany. To insure this identity with the German Novocain, the Federal Trade Commission has submitted the product of each firm licensed to the A. M. A. Chemical Laboratory to establish its chemical identity and purity, and to the Cornell pharmacologist Dr. R. A. Hatcher, to determine that it was not unduly toxic.

"In conclusion: Procaine is identical with the substance first introduced as Novocain. In the interest of rational nomenclature, the first term should be used in prescriptions and scientific contributions."

WHY NOT "CHINESE SILVER"?

BY W. I. NALENCZ, D.D.S., CHICAGO, ILL.

(NORTHWESTERN U. D. S.)

SOME TIME AGO, (it is rather difficult to give correct date,) a Chinese alchemist, probably in vain pursuit of synthetic production of the so desired gold, happened to obtain a new metallic alloy, very much resembling silver, but harder, very malleable, and capable of taking a high polish.

The new alloy was named "*Packfong*," and soon found an extensive application in industry. It was very likely in those remote times, in which the Chinese civilization was at her best, far more advanced than that of contemporary Europe.

Strange enough the same alloy was "discovered" by some German chemists, and became extensively known under the popular name of "German Silver."

The said alloy, made of the same metallic elements, as that of China, is composed of copper, nickel, zinc and a trace of iron. Recently the number of ingredients became limited to three, namely copper (50%), zinc (25%), and nickel (25%). In order to secure greater malleability the percentage of zinc usually is increased, diminishing the amount of nickel. When greater hardness is desired, the percentage is changed so as to diminish the amount of zinc and increase that of nickel.

This "silver" has a wide range of application, and proved to be worthy of its reputation. But why called "German Silver"? It is absolutely wrong. In the first place, injustice is being done to a very useful material. The name "German" is undoubtedly very appropriate for measles, or other Schrecklichkeit, but it would be illogical to apply it to anything good and useful.

Secondly, the Germans are claiming the honor of inventing "German Silver" unrightly. All of it belongs to China. The writer is unable to give definite date of this Chinese discovery, but it had to be a few hundred years earlier than the German accomplishment at Hildsburghausen. The very convincing argument, for it is a decisive fact, that the spoken of alloy is called in Poland and Russia, not "German" but "Chinese Silver"—for the very reason, that it was brought to these countries, not from neighboring Germany, but from distant China, by the tea merchants, very likely.

The Germans naturally must have come in contact with this product, and have only made it more popular in Western Europe and America, because we all know, that they have very little of inventive genius, but an excellent ability in converting the ideas of others to their own purposes, and then announcing same to the world, as their original discovery.

The spoken of alloy is familiar to every dentist. Every one has used it in his college courses in all sorts of prosthetic attempts. It has also a practical application in the dental field, for instance, in the practice of orthodontia, in fixation of fractures of the mandible, etc. Therefore the re-naming of this alloy should be made a dental issue. How shall we name it then? There seems to be no better name than "*Chinese Silver.*"

The adoption of this name instead of the improper and offending "German Silver" would be based on the precedents of its popular use in Eastern Europe, and on doing justice to China. Justice is the main American motive in this great war. Let us all live up to the magnificent American principles, no matter how insignificant the occassion may be, "Square to all, Unjust to none."

BASIC PRINCIPLES OF PHYSIOLOGY

BY SAMUEL E. POND, A.M., WORCESTER, MASS.

INVOLVED IN (A) THE DESTRUCTION OF BACTERIA WITHOUT THE DESTRUCTION OF TISSUE CELLS, AND (B) ELECTROLYTIC, OR SO-CALLED IONIC, MEDICATION.*

(FROM THE RESEARCH INSTITUTE)

I AM GLAD TO BE HERE this morning, and bring to you some of the ideas and results of work in general physiology, applicable to your practice. The attempt has been made by certain great students to study function and vital phenomena after the methods of physical chemistry, leading to a study, in a more exact sense than heretofore, of the transformation of living tissues. In the case of teeth, especially infected, pulpless teeth, there has been no definite progress. The first step known to the speaker was undertaken two years ago by the Research Institute to test some of the principles of physical chemistry and general physiology in the light of dental problems. Work was undertaken in connection with the problem of "ionic medication."

Upon the first topic you will recognize at once; from the facts presented this morning and the facts in the literature up to the present time, that it is relatively impossible to destroy bacteria *without destroying body tissue cells,* except for one possibility. It rather looks as though it were probable, nevertheless, to do this, to some degree, by meeting the bacteria upon their own ground, their specific composition and structure, possibly through bacteriolysins and anti-bodies of that order. These are the only factors to our knowledge that will destroy bacteria without destroying living tissue cells. Reagents which we now use, inorganic and organic chemicals, physical and mechanical forces, do destroy living tissue cells practically to the same extent as bacteria, but we have one factor in favor of destroying bacteria in the presence of living tissue cells. We may sterilize infected tissue, *i. e.,* transform an active agent into an inactive agent, in the presence of a rapidly-regenerable body tissue. And it may be that what may kill bacteria may stimulate certain living tissue cells to renewed activity. In terms of general physiology—to use a more or less exact terminology, infection is largely a metabolic effect, a breaking down more rapidly than building up, either by a parasite, whether animal or plant, or the product of that metabolism. In the case of bacteria, infection may be the result of the transformation of living material by the bacteria, or the dissolution of living tissue by the toxins produced by these cells. In like sense destruction of bacteria (sterilization) would be either the destruction of the toxin and the bacteria—you might say the neutralization of the toxin and the destruction of the bacteria—or a change in the body tissue cells so they will secrete, if I may use that word, an antitoxin or some cytolitic agent which will take care of the bacteria, not alone of the toxin. We use here two terms, inhibition or antiseptic and disinfection or sterilization. The former is really the checking of the growth of bacteria or the neutralization of toxins. Disinfection or sterilization means destruction of the bacteria themselves.

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*Presented as a part of the Seminar, before the Ohio State Dental Society, Dec., 1917.

An analysis has shown that bacteria are living, functioning cells, like other living cells. They are surrounded by a semi-permeable membrane which functions just like the vital membrane of any embryo egg or cell, and about that in most cases appears a capsule composed largely of cellulose. The difference between the bacterial cell and the living body cell is in the capsule of cellulose. Rarely do we find cellulose in animal tissues; most regularly in plant tissues. To destroy bacteria without destroying living tissue cells, it may be possible to destroy the cellulose layer, and thereby destroy the bacteria, if the cellulose were necessary to the functioning of that bacteria. It has been definitely proven that the cellulose layer only functions at certain times, and until we know the characteristic of individual species of bacteria, we cannot predict what agents will destroy bacteria encapsulated by the cellulose layer, and not destroy human tissue cells.

We are then faced by the situation of having living body tissue cells of various compositions, and bacteria as living cells of a different composition, in both cases surrounded by a functioning semi-permeable membrane. This is brought into the discussion for a specific purpose. The relation between structure and function is vital. In living tissues if you destroy the structure, you destroy the function; if you destroy the function you destroy the structure. Almost in the same way is this, for illustration, borne out by a river. Here it means nothing, if there is no water. It would be no river if there were no bed or bank or source or mouth. If you alter any of these, you alter the function of that stream. If you change the quantity of water, its rate of movement, its composition, you change the structure. In a far greater sense are structure and function vitally related in living tissues. If you destroy this relationship, especially the composition of the membrane which keeps living material within the cell different from that outside of the cell, you destroy the functions of that cell. If you can get a reagent, or reagents, in contact with bacteria in sufficient quantity (where the bacteria are localized in a greater quantity than the living tissue cells, *i. e.,* local infection), you may destroy the vital relationship in the case of the bacteria without destroying this relationship in living body tissue cells.

Suppose about the tooth apex you have a localized infection, where supposedly there is largely a mass of bacteria. If your reagent be present in sufficient quantity only to kill the bacteria, you would not antagonize, to any great extent, any living tissue cells. The living tissue cells probably would have but a small portion of the reagent to take care of. That was presumed to be probable and is the backbone of the electrolytic medication. Those conditions, however, do not always prevail. The infection may be spread about. Then you will realize there is not a simple situation to face, but a difficult one. The bacteria you are attempting to destroy may be in the tubuli, in the pulp chamber, in the peridental membrane, between that and the tooth tissue, between that and the alveolar tissue. To concentrate a mass of reagent so that it will destroy the bacteria and not the living tissue cells, you have a complex problem and, first, in getting the reagent from the pulp chamber to the infected tissue.

There exists within the tooth tissue certain physical and chemical conditions that we must contend with—take those of the tubuli, for example. In order to have certain chemical reagents like zinc chlorid or silver nitrate diffused through the tubuli, they must counteract the opposing forces, surface tension and so on. Silver will not readily penetrate the tubules of the tooth wall. Zinc will not, even under the stress of electric current, and even though the tooth wall bears a negative electric charge which should aid the penetration. Copper will penetrate. From iodid of potassium, iodid ions will not penetrate.

The passage of the ions appears to depend on the size of the tubuli, as well as the electrical charge of the wall. About the apex, we are dealing with a larger aperture and a different condition exists. To reach the infection in and about the tooth, not at the apex, the reagents must overcome a considerable number of opposing forces. At the apex, however, to get a mass of the reagent sufficient to kill bacteria is quite a problem. Last summer it was undertaken at the Research Institute to determine how much this were possible, using a mixed culture of bacteria, not an individual species, and under conditions where the diffusion of the chemical reaction was almost immediately uniform—conditions which cannot prevail in the tooth. You will recognize that one cannot have a certain amount of sulphuric acid or zinc chlorid at the localized area as easily as you can in a test tube. We have, then, more ideal chemical conditions prevailing in the test tube and, hence, it would not necessarily indicate that, if we could kill the bacteria in the test tube, we could in the periapical tissues.

Surprising results came from that series. Concentrated sulphuric acid did not kill the bacteria in five minutes, a mass of bacteria grown within the twenty-four hours from an infected tooth; that culture, known to be active, stood the action of an equal volume of concentrated sulphuric acid for between five and fifteen minutes. Hydrochloric acid (*i. e.,* concentrated, about twenty-eight per cent.), was effective in five minutes. Iron salts, saturated solutions, were active in two hours. Lower percentages were not effective. Copper sulphate was active in about the same time. Bichlorid of mercury was active in all its concentrations used in five minutes. Aluminium chlorid inhibited the growth of bacteria in two hours, but did not prevent the growth. You will see from this that a certain mass of chemical agents and a certain mass of bacteria are related. It requires a certain mass of the reagents to change the active bacteria into inactive agents. And this change takes time. You cannot expect disinfection to occur immediately, and you cannot have the same results about the teeth that are recorded in the test-tube experiments.

It seems almost impossible to rely upon the agents which have been used in electrolytic treatment as disinfection agents, even if they pass thorugh the apex or through the walls of the tooth, in any concentration which (within two hours in a test tube), will disinfect an active growth of bacteria.

The number or quantity of bacteria (which were virile) exposed to the chemical action was not known in this case. That makes a great difference, for a culture that is not active may be controlled easily; and further, the mass of bacteria, the mass of their potential food, and the temperature under which bacteria exist have much to do with disinfection. In the living body we have other things to contend with. The acid content of the body tissues makes a big difference, and that again was not taken into consideration in the test referred to.

Further studied was the effect of electric current upon bacteria. Weak currents do not appear to kill bacteria; they do not kill living tissue cells. What, then, happens? The electric current is carried from one electrode to another in both directions by so-called ions, particles of matter bearing specific electric charges. Electricity cannot be conducted in liquid conductors except there are such particles. When the current passes through a mass of bacteria, the ions are moving from the positive to the negative and from the negative to the positive poles. The bacteria and other living cells accommodate themselves to the changes in this ionic content at their membrane surfaces. If you change the ionic content in the medium so that it is different from that which exists in the living tissue, you may kill the bacteria. Increasing the electric current to 100 volts d. c. there was heating, and it was found with the passage of the electric current for one minute that an active bacterial growth was inhibited, and, further, that disinfection ensued in five minutes; but when the temperature was kept below 37.5 C. no disinfection ensued after the passage of the current for over three hours, showing that even strong currents are not always effective.

With the combination of electric current and electrolytes many investigators were led to think there was an electrolytic change. We are here, you will recall, discussing *direct action* of electrolyte or current, or both, upon bacteria and living tissue cells.

What happens to the electrolyte during the passage of electric current is the discharge of the particles of matter at boundary surfaces. If this is true, when you bring heavy metal salts to the peridental membrane, you are likely to destroy the membrane. It may be regenerated, but you destroy it beyond regeneration unless the concentration is low and the time of action is short. During the passage of the electric current, this discharge of the particles is called electrolysis, that is, the deposition of metallic elements at the poles. It was presumed there might be such an electrolytic effect in the body. Careful tests are very difficult. One result of our investigation has been to discover the evolution of chlorin, hydrogen, oxygen and the deposition of some metal salts. The effect of these gases in the periapical space has not been determined, and must be before definite knowledge will be obtained. The effect of the heavy metal salts is known. In some cases where there is not a proper content of blood or body tissue sufficient to antagonize such ions as zinc or sodium, many of the living body cells are destroyed more rapidly than the bacteria. With some ions, the living body cells react more slowly than the bacteria. It looks as though a concentration of such ions would be more effective in destroying bacteria than living cells. But more careful tests must be carried out.

We are trying to get a more or less exact knowledge. This is not wholly satisfactory, and the study of the direct action of electrolytes, electric current, and electrolytic products on bacteria seems to indicate that, unless we use other ions than those which have been used, we cannot destroy, under conditions which prevail in the human body, bacteria without destroying living tissue cells. There is, however, this to note: The bacteria and living tissue cells react with some elements and form compounds which are disinfecting in themselves. Such has been the discovery of Dakin and others, that chlorin, which forms a chloramine group, non-toxic to living body cells, is highly toxic to bacteria. We also have the secretions of living forms to consider. We may attempt to bring about phagocytosis, first neutralizing the toxins produced, then destroying the bacterial cells, and probably destroying the protoplasm of the bacteria. There appears to be a relationship between the molecular structure of the cells and the antitoxins which are produced in combating infection.

There has arisen another fact. It has been found that the addition of certain salts like barium will transform living protoplasm into a membrane-like constituency. It has been likened, by Bancroft at Cornell, to the transformation of cream into butter. In cream we have water with fat particles suspended; in butter we have fat with water suspended. We speak of these as emulsions. In one case the water is continuous, and in the other water is discontinuous. Under the microscope it has been observed that it is possible to change a water suspension to a fat suspension, and the reverse. Those changes apparently do go on in the living tissue, and as a scientific guess, it is presumed the membrane is formed from protoplasm by that means. Many elements come to the surface of cells and affect the protoplasm there, and at certain definite boundaries change the structure materially. If that is true, we may, instead of having water supported in a fat system, as at the membranes, say of bacteria, reverse this condition and have water the continuous phase, destroying the normal functions of these cells. That is presumably the action known as cytolysis; and cytolysis is closely related to disinfection. We are, then, dealing with the possibility of the destruction of the membrane by an apparently nontoxic agent, which changes the structure and relationships of the membrane.

The question of getting destructive agents at the sources of infection remains open. So far we have carried out the series of experiments with electrolytes of the heavy metals, silver, copper, aluminum, iron and other metals as well, and have not found them satisfactory, because many of them will not penetrate the tubuli of the tooth wall. Some agents have been found to change the membrane and change the structure of the bacteria, through the use of calcium in one case or sodium salts in another case, and this may explain why many definite results are being obtained with sodium chlorid. The sodium ion may pass through the apex and the tubules, and possibly reverse the phase of the membrane and destroy certain bacteria. That does not apparently hold as to mixed bacteria. When the results of this experimentation are carried further, you may know whether that is possible.

It was supposed the electric current carried the electric particles through the apex only, but in many cases the foramen is so constricted this is not possible. As pointed out, gas is evolved at the apex, and the current ceases thru that channel, throwing the bulk of the conduction of the particles upon the tubuli. There we are dealing with very complex phenomena, and there is no way of telling at present what effect we are producing upon living tissue cells.

*SOME FUNDAMENTAL PRINCIPLES UNDERLYING THE STERILIZATION OF TOOTH AND PERIAPICAL TISSUES BY MEDICATION OR BY ELECTROLYSIS. WHAT EVERY DENTIST SHOULD UNDERSTAND

We may ask at the outset, what is the difference between living and non-living systems? Most of you will recognize that if you transform sodium chlorid into sodium sulphate chemically, the reaction goes to an end, and the chlorid is transformed practically wholly to sulphate. This will not be reversed except by the use of a great deal of mechanical force and other chemicals. If you take a stretched string and pluck it, a wave travels along from the point of stimulation to the point of fixation. With a metal, as in this case, the wave travels at a certain rate along the wire. Likewise if you pinch a muscle or nerve, an impulse travels along from the point of stimulation to point, or points, of fixation. In the case of the stretched string, a muscle or nerve, we find there is always passage of electric current, a bioelectric variation. The pinching of a nerve or a metal has changed the condition of the nerve surface. There are, then, somewhat similar conditions in living and non-living systems in regard to electrical tension, but with the string there is no known chemical reaction; in the muscle and nerve there is. We are at once concerned with chemical change. In the case of living systems we have a mixture of different chemicals. Take a single-celled animal, which has cytoplasm in its interior, and a boundary membrane

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*This was a discussion at a clinic on physiology and sterilization. It is not a part of the article, "Basic Principles of Physiology".

which functions, allowing gases to pass to the exterior and food to the interior. If you change the electrical tension of that membrane, you alter the function of the cell. If you change the function you change the structure.

Now we may ask, what is the structure with which we are concerned? In the interior there is an emulsion something like oil and water. Shake oil and water and they separate. Add soap and they stay emulsified for a longer or shorter time. If you use soft soap you have oil in water, hard soap you have water in oil. Protoplasm is much water with fats suspended. The membranes are the reverse, the water is suspended. To pass through that membrane material must be soluble in fats. Water solvents will not pass through unless the membrane is destroyed. Some chemicals, fats, ether, etc., do readily penetrate the membrane.

The difference between the non-living and living system is that in the living, if you alter the surface there is automatic realteration and recovery, while if you alter an emulsion of oil and water there is no recovery unless by external agents. There is another difference, in that there is an equilibrium between the forces in living tissue, which tends to maintain a certain condition. In order to destroy a living organism like bacteria, you must transform the membrane or interior of cell. You may do it mechanically or chemically, or by agents which osmotically pass in, or by altering electrical conditions. But whether it is a purely chemical or physical system, or a living system, it takes a certain amount of material to change that living into a non-living mass, the infecting into non-infecting bacteria.

In living systems as bacteria, if you want temporarily (antiseptic) or permanently (disinfection) to transform an active mass into an inactive mass, we must use a certain agent in whatever mass is essential. We have found that the amount of reagents, chemicals and electrical forces used in electrolytic medication would not transform, *directly*, mixed oral bacteria in the time available, when under the conditions which exist in the human mouth—that, for example, bacteria would withstand concentrated sulphuric acid for more than five minutes, and so on. Chemical reactions in living or non-living systems require time. To have reproducable results in treating any disease, in re-creating destroyed tissue and the like, you must be a respecter of quantities and of time. One cannot, with some chemicals, change a mixed culture of bacteria from infecting to non-infecting in a test tube (*where the reagent may diffuse almost at once*, or is diffused generally so that it comes in contact uniformly with the bacteria), unless you allow two hours or over.

Now the passage of electric current through living tissue is accompanied by the transformation of matter. When you put sodium chlorid into water, it, so to speak, ionizes, or dissociates. It breaks up into sodium and chlorin. Pure water will not conduct electricity; pure sodium chlorid will not. Put the two together and they will. Sodium and chlorin separate. Most salts dissociate in water. Now, electric currents cannot pass unless there are these dissociated, conducting particles. When electric current is passed through the human body, there is conduction by the ions, which, when you turn on the current, temporarily alters equilibrium and you have a stimulation as the result. The transformation of the ions goes on after the circuit is closed. There is, apparently, a compensation for those ions at the surface of each cell.

Now, primarily, in controlling disease, we must change an infecting agent to an uninfecting agent. One may do that either by destroying the membrane, or may otherwise directly destroy the cells physically or chemically. Chemically speaking, one must convey certain amounts of reagents, which will transform a certain amount of bacteria to an inactive non-infecting mass.

PRESIDENT'S ADDRESS.*

BY J. W. SIEGFRIED, D.D.S., DAYTON, OHIO.

YOU HAVE SEEN fit to honor me to direct the affairs of the society for the year 1918-19. I appreciate the honor and will attempt with your help to carry out a program which will not be too voluminous nor unwieldy; believing it will be far better to carry through a sparse program than to attempt one beyond our means or ability. From time to time new ventures will arise which will take time and energy, and a place in our activities must be left for the propagation of these.

We have two important things which must not be allowed to lapse: I refer first to the oral hygiene work of the society. In a manner of speaking we are all oral hygienists, for no work can be accomplished in the mouth without making the hygienic condition of that mouth either better or worse. I sometimes wonder if we always make it better.

In the broader aspect, let us all be teachers this year, and especially when we have the younger patients, can we not pause a few minutes to impress upon their minds the importance of regular inspection by the dentist, and the regular care of the teeth, cleansing and massaging?

Every one of us belongs to a church, lodge or society made up in large part of laymen, and as the past chairman of the oral hygiene committee it has been a matter of keen regret to me that you have not asked some member of the committee to appear before some one of your organizations, or to appear yourself, with the aid of the lantern and slides provided for us and which are at our disposal at the Welfare Department of the city, and lecture on this subject. It is not at all hard to do and you will find that the people are intensely interested and will ask you some very intelligent questions along this line. I commend to the oral hygiene committee an activity commensurate with the importance of the work, and hope that the plans projected last year will be carried out. If they are, your spare time for the year will be taken up.

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*Delivered before the Miami Valley (Ohio) Dental Society, Sept., 1918.

The other subject of which I hinted is also in the nature of unfinished business. I refer to the work of the Preparedness League. Ohio has a good rank among the states but could have had a better one, had we in Dayton taken the time and trouble to send our work cards in to Dr. Tizzard, as he has time and again begged us to do. It is also true, as I found in conversation with some men in Chicago, that all the organization work was not reported in, and Ohio has lost some of her percentage there.

Dayton as a district center has been keeping up with the times and our quota of men worked for has been very good. I wish to give honor where honor is due, and, gentlemen, I think we should all honor our good friend and loyal confrere, Dr. Ed. Tizzard, for the splendid part he has played in keeping this movement up to the minute, and to his able assistant, Dr. Cockerill, the secretary of the organization. You will note when you receive your programs that Dr. Tizzard is now the supervisor of the Dayton District.

Dayton as a city certainly needs no encomiums from me; yet we as dentists are overlooking some mighty good things which are possible to us as an organization. On a boat trip from Chicago to Detroit after the convention, I met and associated with Drs. Boardman and Proctor, of Chicago, Grant and McIntyre, of Providence, Herts, of Rochester, McDonald and Webster, of the Royal Colloge of Toronto. They were all full of questions about Dayton as a city and of the Ohio organization. They would always say, as every one does when discussing conditions in Ohio: "You fellows certainly work together out there." It seems that in other sections that is not so true.

Since I have been a member of the organization we have gone after and gotten three big things, all accomplished by team work and the good will of the fellows. *First*, the biggest strictly oral hygiene meeting for laymen the world has ever known, I think, the Ebersole meeting in 1914, which attracted 2500 interested people; *second,* the Ohio State Convention, which was wonderfully successful and which led some of us to believe that at some time in the future we might be able to handle the National; *third,* a Dayton man for president of the Ohio Association, Dr. Z. N. Wright.

Ever and anon an organization has to pause, catch its breath and add to its membership, or go back. We cannot continue to do big things unless we have a great preponderance of the ethical men of the city and district in the work with us. Let us therefore constitute ourselves a membership committee of the whole and get these men in this year, so that from now on our society will be able to do things, always keeping in mind that several of our good men will be leaving to join the colors and their places will have to be filled. Cannot our slogan be, "One hundred in the society and every member a Preparedness Leaguer"?

Nothing has impressed me more in my several trips over the states in the past year than the tendency men are showing to get together for study and mutual help. This as a rule has been by groups chosen by fraternities, or by the attraction some close student has for certain men in his society. "Let well enough alone" will no longer serve for dentists who expect to prosper, for the public really knows too much to be satisfied with less than the best, and the best is not to be attained without a continuous going-to-school process. I therefore suggest that some method be worked out by which four or five study clubs for the purpose of meeting once each two weeks, each club perhaps pursuing a different course, and each club reporting to the society at the end of the year, the results of its study. The fraternities here represented could do that, or study masters could be chosen and kindred spirits gathered about them to pursue this important work. At any rate let us study!

We are going to have at the December meeting—I hope I am violating no state secrets (no pun intended)—two men who will each lecture to twenty-six men, chosen from the component societies, and the two members—one in each branch, will then come back and give us the benefit of their post-graduate work. In this plan, original in its detail in Indiana I think, we will have the nucleus of two study clubs, and this might be the start of a very good and interesting work, not only in our society, but in others over the state.

I want to see a group of men of Dayton doing something big, something advanced, like the work of the Denver unit at Chicago with their inlay technic, or the Detroit unit at New York with their prophylaxis. Or I should like to see some man with ability above the average pushed to the front as a leader in the profession, like the many men who might be enumerated in other cities. I don't care whether or not it is for pre-eminence in organization work or as a writer or as a technician—when we see a man with ability let's get behind him and push, for the Miami Valley Dental Society never can be in the front rank dentally unless we *push* some man or men up there to *pull* us up.

Do you know that hundreds of men in this valley are so well trained in the use of the micrometer that it is nothing unusual for these machinists to turn out work down to the ten-thousandth of an inch? This city, with Schenectady, occupy the proud positions of being the two centers where the very finest machine work in the country, if not in the world, is produced; hence the name, "Dayton, the Precision City." Why not "Dayton, the Home of Precision Dentistry"? Why cannot this society be known from coast to coast as the place where the finest crowns, bridges, inlays, plates and root-canal work is produced?

We already have the close-knit organization, correlated and fraternized to the limit of the ideal. Now remains the application of the potential power for results embodied in such an organization; now remains also to find some nucleus, some spermatazoon, if you please, to fertilize this living, vibrant ovum, which is our society.

Perhaps some member of our group has an idea or plan, some new and original thought as far-reaching as Percy Howe's silver nitrate and formalin for treating diseased and tortuous canals. Not all men are capable of laying out plans of procedure, after having established the worth of a new idea—witness the number of failures among really clever inventors.

Genius is an aptness for creation descending from God himself; or it is a desire for accomplishment which may have fruition only by the exercise of eighteen hours' work a day. This power of application must also surely be descended from God himself. There are men like Edison and our own Kettering who have both the aptness and the application to rear astounding stepping-stones in the work of the world. It is sure that no member of this group of men is going to rear an enduring monument to himself or the society, who is content to rest upon his oars and practice dentistry with only that which he learned in college. I recommend that we try a few extra hours a week for research work and study.

Dr. Greene Vardiman Black, at the age of sixty, came to his office an hour before business hours to devote that time to his painstaking research work. At the age of seventy he came two hours earlier because he found that he was not getting enough done in the time in which he hoped to live. Dr. Black was not a genius, probably, except in so far as he was willing to work the many extra hours which we younger men take for pleasure. But it will be years before another man leaves the wealth of literature and accurately-performed experimentation that graces his brilliant career.

We are in the midst of a world war—a war into which our country has been reluctantly drawn, but, thank God, we have not gone in too late. Because of our peculiar work, it probably will not be necessary for many of us to expose our lives to danger or death, however willing we may be. Our country demands that we live and work for it, not necessarily to die for it.

While it is not incumbent upon me to remind you of the causes leading to our entrance in this struggle, yet a few facts stand out so clearly that any discussion of the causes involved must always include them. I believe, for instance, that we are not at war with a people or even a despotism so much as we are at war with an idea. Two great and parallel ideas had grown up in the world; had grown so large and had shaded so much ground that sooner or later the shadows were bound to conflict. The Teutonic idea, with its divine right of kings and its iniquitous vassal system of the individual to the state, initiated in the third century by a robber Hohenzollern and nurtured by every crafty prince and princeling, puny king and reactionary emperor down to the present partner of the German beast-Gott—he of the hereditary withered arm. The Anglo-Saxon idea, with its Magna Charta wrung from King John in 1215 by the twenty-five English barons, was not so much to protect the commoners of England, it is true, but to give the barons greater freedom and rights. But it was a beginning of the Anglo-Saxon representative government, and the beginning of the Anglo-Saxon idea of the state *for the individual.* In 1694, Oliver Crowmell was destroying a weak and vacillating monarch in England, while only ten years later the Great Elector was setting up an absolute monarchy in Germany.

In 1848-51 my grandfather (and probably some of yours), was fighting for a short-lived freedom for Germany, and seeing the hopelessness of it, fled to Paris and on to the Land of the Free.

In 1861, when Lincoln was called from his modest law practice to Washington to become the best-loved of all the presidents by all the peoples of all the world, Bismarck was called from Frankfort to Berlin to bind his people in mental shackles a hundred times more fearful than iron, and which planted ideas of dishonor and immorality, and made them—the people—accept those ideas as honorable and moral; so that unwarranted attacks on Denmark, Austria and France in turn were right, for did not that spirit aid in fixing the magic formula, "Deutchland Ueber Alles," the more firmly in the minds of the poisoned and poisonous population?

In 1914, when the madmen of the central empires were setting the world on fire to avenge the death of an addle-headed near-monarch, the secretary of state of our own beloved country was trying to conclude treaties with all nations that would prevent any nation from hurrying into war on slight provocation, or indeed on any provocation for a period of one year following the *casus belli.* I do not say that the Honorable William Jennings Bryan was right; I simply show how a peace-loving nation tries with all the means possible to prevent war, while the German mind tries with all its filthy strategy to make it. Verily there is but one name for filthiness worse than the beasts'; there is but one name for cruelty worse than Atilla's; one name for traitorous, lecherous double-dealing, and that is *German.* Neither Hun nor Swine expresses to my mind the evilness of a race as does that most contemptible word. For the coming centuries it will be anathema even to the savages of the earth.

When the immortal Lincoln can dedicate: "That the government of the people, by the people and for the people shall not perish from the earth," and our own beloved Woodrow Wilson can re-dedicate our whole citizenship to the principle: "That the world must be made safe for democracy—for right is more precious than peace—America is privileged to spend her blood for others, God helping her she can do no other," then, my fellows, we can re-dedicate ourselves to harder, broader work; we can leave our offices and sell Liberty Bonds; we can help by saving, we can fight by working, we can serve by giving.

The flag is all that I am, that you are;
  An emblem just matching the nation;
It wilts when we're sighing, it is proud when we're trying—
  The flag is our daily creation.

The flag is a symbol of purposeful hours—
  If I make a mistake and conceal it,
Or fail in my duty it will suffer in beauty—
  Or falter and quit, it will feel it.

When a workman adds a last perfecting touch,
  When a soldier for others is dying,
Or his mother just graying makes plans while she's praying—
  The flag is not drooping—it's flying!

It waves o'er the ocean, it billows in France,
  Its destiny ours in the keeping;
It ripples in pleasure when we strive without measure,
  It's Columbia sowing or reaping.

It's the uncovered soul of a nation determined,
  And its colors in song and in story
Are grown ever brighter as hearts are made lighter
  In Freedom—God loves you, Old Glory!

—"The Flag Is Just What I Make It," by J. W. Siegfried.

CORRESPONDENCE

THE USE OF GOLD BY DENTISTS

The author of the following letter was the third man in the Cincinnati Dental Society to volunteer his services in the army after war was declared, but was physically disqualified at an examination conducted at Columbus Barracks the third day of June.—EDITOR.

Just now everybody in the dental profession, seems to be running around in circles, for the lack of gold. For my part I can see clearly why Uncle Sam has cut the allowance of gold for dental purposes fifty per cent.

If you will but recollect a short time ago, in fact just after we went into the war, a few people volunteered the services and the material of the majority of the dentists of the United States, for nothing. They in fact, said to Uncle Sam that "the little amount of gold that we would use in fixing the soldiers up, don't amount to anything, the time is the big thing that we are volunteering." When it came to the work in the various sundry cantonments, and aboard ship, and in the naval recruiting and training bases, in fact wherever the United States government came in contact with dentistry, these dentists let it be known to those in authority, that gold was not an essential part of our profession. Now under these circumstances you can't blame our Uncle Samuel for doleing out the gold to us. He has had these wrong impressions given to him by men on whom he thought he could depend for correct information. The truth about the whole situation is, that gold is an essential to dentistry and one of the most vital essentials that anybody could name.

Dentistry, requires gold, to the amount I should judge at the rate of an ounce per month per dentist. This is putting it, in my opinion, at a rather low figure. The only way, in my opinion, to cause a readjustment and a new allotment of gold for dental uses, is to convince Washington, not through these boneheads that said gold was not an essential in dentistry, but through our dental societies, and petitions direct to the President if necessary, to quickly counteract a wrong impression which has gained credence in Washington.

If we could locate several prominent men in Washington who have had dental work, requiring great quantities of gold in their mouths, to go before this investigating committee, and there show them how lavishly gold is sometimes required, to put a mouth in workable order, then I think their eyes would be opened to the necessity of gold in dentistry, when they realize the number of people having dental work done. So much of the gold used by the dentists is hidden and camouflaged, that doubtless this was another reason for the cutting down of our supply, but if they could but watch the operations in even a small dental laboratory, they would be convinced that gold is a metal that we cannot possibly do without.

The great trouble has been that we have talked to our patients about the value of time, in dentistry. We have skimmed lightly over the material side. We have done this purposely, and have included the price of material in our figures.

In this manner the impression has gained currency among the laity, that materials, gold included, are not such important articles as we claim them to be. There is an old and wise saying, viz: "Neither wise men nor fools, can work without tools." Gold is one of those tools, so essential to dentistry, that if it were eliminated at one fell blow, dentistry would be paralyzed.

There is no doubt in my mind that when the Director of Gold of the War Industries Board, at Washington, hears from the dentists of the country, he will be of the opinion that gold cannot be eliminated from dentistry, nor its supply decreased without working the greatest hardships on the public at large. When this matter is taken up by the dental societies and put in concrete form before the director, I can't see why an adequate supply of gold should not be allowed for dental use.

J. R. JOHNSTON, D.D.S., Norwood, Ohio.

Preparedness League of American Dentists

Notes and News

COMMUNICATION FROM THE PRESIDENT

America is to be the greatest nation of the world. Why? Because we are giving freely to help the rest of the world. Without the untold sacrifices we have made and the billions upon billions we have laid on the altar of humanity, we could not become great. Have we done this in a spirit of selfishness? No! We have done it without thought of reward. We are exemplifying our conception of the Golden Rule.

Do you think the millions of women working patiently month after month for the greatest organization of the world—the American Red Cross—are looking for personal benefit? Do you think that body of self sacrificing girls and women who never think of themselves—our noble nurses—are looking for self aggrandizement as reward for their labor of love?

Let us not debase our own thoughts by permitting even a suggestion of such things. YOU know it is not possible.

Where, then, does each one of us stand in relation to the world's work that is before us? Each one knows just how much he has done and what motives prompted him in doing it. This is a matter unto himself. But no matter how much we have done, we must do more The only limit is our physical capacity.

The October number of *The Literary Digest* prints an article entitled "Europe Admiring Yankee Teeth." The teeth of our boys have been an object of admiration by the other armies and the aritcle makes special mention of the splendid services of American Dentists. This is encouraging to us and indicates that our efforts are appreciated and should prompt us to do more than ever to send our boys away in as good condition as possible.

Do you know that when our boys have toothache while in the trenches, their teeth are extracted and they are sent back immediately? It does not matter if it is a front tooth that is aching, it must go, even though it could be treated and filled. When those boys return to civil life, they will be badly handicapped. We must avoid such a situation as far as possible by doing our duty by them before they leave their home town for camp. This is the duty of the League.

In a recent letter from a member of the Dental Corps now in France, he says, "The League is not forgotten over here. I have met many of our soldiers who had their teeth fixed by its members and they are very grateful. I have met others who did not take advantage of the opportunity and they are very sorry." The work you do for them is fully appreciated when they are "over there."

Let us spare no effort to help our boys.

STUDY CLASS IN POST-WAR DENTAL WORK

A course of practical instruction in the most recent and approved methods of war oral surgery has been arranged by the Royal College of Dental Surgery, Toronto, Canada, and the Preparedness League of American Dentists during the week, December 16-21, 1918.

That it may be international in character, instructors of unquestioned ability from the United States as well as Canada will colaborate in the object of giving American dentists the benefit of such knowledge in oral surgery as has been gleaned from actual experience at the front.

Canada now commands a large amount of clinical material which is constantly being augmented by the many wounded soldiers being returned from overseas. The teaching and laboratory facilities of the Royal College of Dental Surgery has been given over to this object, and the operative clinics will be given in Toronto Hospitals.

The number will be limited to one hundred, which will be divided into classes of twenty-five each, thereby insuring the personal attention of the instructors for each member.

Colonel W. H. Thompson, in command of the Dental Corps of Ontario, has extended the privileges of the numerous military clinics and the full assistance and co-operation of the military for the purpose of making this course most practical in character. Major W. E. Cummer will instruct in prosthesis and Colonel G. G. Hume who has returned from three years' service overseas, will have much of practical value to impart.

This is an exceptional opportunity, and members of the League should take advantage of it. A fee of fifty dollars will be charged, which goes to the instructors.

Announcement will be made later relative to carrying on this course in the principal cities of the United States.

J. W. BEACH, *President.*

Report of Committee on Motor Cars for the Dental Service at Military Camps

In order to bring this report fully up to date, it may be well to recapitulate. The campaign to supply motor cars for the use of dental officers at military camps was begun about the middle of July of this year. The progress to date (Nov. 1st) once more evidences the generosity of the members of the League, as well as of others reached by the League.

Drs. C. F. Ash, and W. D. Tracy, the past and present Directors General obtained donations from a few dentists and one generous patient (the latter contributing $500.00) and a car was delivered to the Dental Service at Camp Upton.

At Chicago, the members of the American Society of Orthodontists by individual subscriptions donated $1,131 and a car was purchased and delivered to the Dental Service of Camp Greenleaf. That these cars greatly add to the efficiency of the service and thus contribute to the welfare of the soldiers is easily proven. Col. Snapp reports that in six weeks the Greenleaf car had traveled 1,800 miles on official business. Dr. Thomas B. Hartzell, after a visit to Camp Greenleaf, writes enthusiastically of the work done at the Dental Training School, and then says:

TESTIMONY OF DR. T. B. HARTZELL

"One thing that is proving of great value to the boys is the gift of the car. *I wish that every camp in the country could have one.* The military establishments of our country are so large that the distance to be traversed by the officers, in charge of our dental service each day, tire the men out more than the actual work itself. Camp Dodge, for instance is a good example. The walk from the lower end of the camp to the hospital is almost *four miles,* and it is my guess that the camp is probably *six miles* long. A camp dental surgeon who visits all of the infirmaries in a camp of this size walks all day. We fellows who stay at home and ride in our comfortable cars (or even in trolleys) have little appreciation of the magnitude of the work our men have to do, and I hope that you will keep the matter of obtaining additional cars going. To that end, I enclose an additional check and am only sorry it is not larger."

Dr. Hartzell had made a generous donation to our car fund before visiting Camp Greenleaf, but after actually observing conditions he sends us a second check. And that is exactly how every man feels who visits the Dental Service at a camp. Hence the undersigned would like every Loyal League member to spend an afternoon in the camp nearest to him and then express his feelings to some member of this committee. It is to be hoped that Dr. Hartzell's last check may prove to be seed that will grow into a car for Camp Dodge.

TESTIMONY OF DR. HENRY W. MORGAN

Dr. Henry Morgan writes as follows on this subject:

"Sometime since, I was in the great Artillery Training Camp, Zachary Taylor, and I saw very forcibly demonstrated the necessity for means for dental boys to get about. The members of the unit who came to the hostess house to receive me, had to hire a jitney and when the major in charge wanted to send me back, after dark, he had to call on the Red Cross automobile service. Everything was cheerful and pleasant and very agreeably done, but I could feel that I was putting other people to trouble to get me back and forth.

"Fifty-eight thousand men—two Dental Units—and no automobiles! I found sixteen chairs in Unit No. 1, but I did not get to Unit No. 2. Both floors of the building, as planned by the Surgeon General's Office, are being used for patients. Major Mann, in charge, was courteous and cheerfully showed me through."

In order that this campaign might benefit as many camps as possible, the officers of the League authorized the chairman of the Motor Car Committee to enlarge the committee by the addition of a member for each camp. These assignments have been made but have not all been accepted. Reports therefore will be made only from those who have agreed to actively participate in the movement.

CAMP FREMONT, CALIFORNIA

Dr. John D. Milliken was the first to accept membership on the committee, becoming the Subcommittee for Camp Fremont. His report dated Oct. 25th, is most satisfactory. It reads as follows:

"I turned over the Dodge car to the Camp Fremont Dental Unit last week and have been waiting for an official acceptance, with a picture of the car to send you. We had the Preparedness League emblem in colors painted on the car with the words, 'Dental Service, Camp Fremont.'

"We also have sent them some furniture for their lounging room for this quarantine makes them all stay in camp. With a comfortable lounging room having reading matter, we feel the boys will not suffer from homesickness so much, as they will feel that their fellow dentists at home have them in mind, at least enough to think of their comforts.

"I have written Doctor McCoy, in Los Angeles to get a car for Camp Kearney and think he will do so."

CAMP KEARNEY, SOUTH CALIFORNIA

Dr. McCoy some time ago accepted the assignment for Camp Kearney and with the aid of the Los Angeles dentists the car undoubtedly will soon be provided. Already the dentists of that section have furnished a club house for the Dental Service at that camp.

CAMP LEWIS, WASHINGTON

Dr. Frank Shaw is looking after the interests of this camp and we probably will have good news from that section by next month.

CAMP SHERMAN, OHIO

Dr. Frank Casto is the committeeman charged with obtaining a car for this camp. Frank is certainly a live wire. His method is very simple and is recommended to committeemen elsewhere. He just ordered a car! And he notifies us that it is promised for delivery on Nov. 7th. He divided his territory into zones appointed a man in each zone, allotted him a quota to be collected from his zone, and having posted these letters went around and ordered his car. Could anything be simpler? These fellows are just obliged to raise their quotas. The honor of their section demands it.

CAMP LEE, VIRGINIA

In reply to a letter asking him to accept a place on our committee, Dr. J. A. Cameron Hogan, Richmond Va., proved to be another wide awake executive. Dr. Hogan writes as follows: "We have been working on this matter for six weeks and have four hundred dollars already in hand. Our object is to obtain a Dodge car for Camp Lee."

CAMP DODGE, IOWA

Dr. H. E. Latcham, Jefferson, Iowa, was asked to care for Camp Dodge and sends in the following very satisfactory reply:

"I am very pleased to inform you that we anticipated your notification and have plans started whereby we expect to furnish Camp Dodge with a car in the near future. It is our intention to secure funds from our District Dental Societies at their annual meetings this fall, either through popular subscription or direct from the treasury, in accordance with specified quotas.

"This plan will be under the direction of Dr. E. R. Swank, Des Moines, Iowa, C. N. B. B. Dr. Swank is secretary of the Iowa State Dental Society and Supt. of the District Societies, is a good organizer and I am sure will secure the co-operation of Iowa men and the dental profession of neighboring states tributary to Camp Dodge Selectives."

REPORTS FROM THE CHAIRMAN'S OWN SECTION

The plan outlined by Dr. Latcham, of taking voluntary donations from District Society members and also subscriptions from the Society treasuries has been very successfully applied in New York and vicinity. To save postage an appeal signed by the chairman, was sent out, with the programs of first meetings of the District Societies of this section, soliciting individual subscriptions to our fund. Dr. Fisher, a member of the First District Dental Society, and a former member of the Army Dental Corps, conceived the idea that the First District could afford to contribute the price of a car. He appeared before the Board of Trustees and was ably seconded by Drs. Ash and Tracy, with the result that the board unanimously recommended and the Society later voted to subscribe the purchase price of one car.

On the following Monday evening, at the meeting of the Second District Dental Society we were practically quite as successful. The Society was asked to subscribe $500 from its treasury and this was done without hesitation. During the same evening a member, Dr. Schreiber, donated $750 the largest individual subscription thus far received which he wished applied to a car for Camp Merritt.

CAMP MERRITT, NEW JERSEY

By a fortunate circumstance the undersigned learned of a medical gentleman who had just entered the service, and who had a Dodge car which had been in use for less than four months. This car was found to be in excellent condition, and was purchased for $750 and delivered to Camp Merritt, thus exactly complying with Dr. Schreiber's wishes.

We are pleased to report that as a result of these recent collections, in addition to the car delivered at Camp Merritt we have funds in bank sufficient for two more cars, which will be delivered shortly.

IMPORTANT NOTICE TO MEMBERS OF THE COMMITTEE

Since the presentation of cars to Camps Upton and Greenleaf, important changes in military regulations have been made. This has entailed a change in our method of delivering cars. Therefore committeemen are requested NOT TO DELIVER ANY CARS without first communicating with the undersigned.

R. OTTOLENGUI,
Chairman, Committee on Motor Cars.

SOCIETY·ANNOUNCEMENTS

North-Central Ohio

The annual session of the North-Central Ohio Dental Society, scheduled to take place in Sandusky, October 16th, but postponed on account of influenza, will be held on Wednesday afternoon, January 15th, 1919, with the same program as the one planned for October.

American Institute of Dental Teachers

The next annual meeting of the American Institute of Dental Teachers will be held at Hotel Piedmont, Atlanta, Georgia, January 28, 29, and 30, 1919.

Papers on the teaching of war dentistry and an exhibit of war appliances will be the main features, and along with these will be the usual papers on teaching methods.

All persons interested are cordially invited.

ABRAM HOFFMAN, *Secretary.*

381 Linwood Avenue, Buffalo, N. Y.

Annual Meeting of the Dental Protective Association of the United States

The annual meeting of the Dental Protective Association of the United States will be held at the Palmer House, State and Monroe streets, Chicago, on the third Monday of December, the 16th, at 4 P. M., sharp. The report of the officers will be given; a Board of Directors will be elected, and such other business transactions as should come before the Association.

All members are urgently requested to be present.

By order of the Board of Directors.

J. G. REID, *Pres.*
J. P. BUCKLEY, *Vice-Pres. and Sec'y.*
D. M. GALLIE, *Treas.*

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

LACONIGRAMS

Have you heard that the war is over? Do you know that in this part of the U. S. A. we haven't had so much as a pinch of snow? And do you also know that many of the Boys "over there" couldn't see it any other way than that the hun would be beaten to his boots "Before the snow flies?" Of course, the Buddies in the trenches and with the big guns are supposed to know nothing at all about strategy and little about tactics; but they do know when they punch something that feels soft, mushy and wobbly, and that's precisely how Mr. Superman J. Heinie has been feelin' of late. One of the boys wrote his brother still over here, but awaiting his call eagerly; "Forget it; you'll never come over; we've a million more than we need already. We keep tolerably well under cover in daylight, but we cavort all over No-man's Land, into the hun trenches and where we please at night, jussasso there wasn't a Fritzie within a thousand miles." Another one said: "The man-power doesn't bother us at all; only the machine-guns. Soon as we find their nests and get to them with the steel its a case of Kamerad! The men simply melt then." Any how, fellers, it's over, so far as the fighting, and the raping, and the looting, and the murdering, and the crucifying, and the mutilating, and the bloody brutal slathering boasting of Busted Bill are concerned: and now comes the 'clean up.' Did you ever see a bar-room the morning after a free-for-all? Well, there are tens of thousands of square miles over in France and Belgium and Serbia and Roumania that look just like that, only a lot worse. Take a good look at the first superhun you meet and see if you can imagine anything else that he would do—the great, hulking, blithering, awkward, flat-footed sun-of-a-sea-cook, with about as much intelligence in his face as in a hallow'een pumpkin. Wawgh! If you can pronounce that you will know the world's verdict as to the physical, mental, moral and psychic qualities of The Man That Walked With a Goose-step; the world wonder, THAT WAS, but never can be again."

Just about a hundred years ago the great Napoleon proved to himself and the world, once and for all time, that the military conquest of Europe is impossible; much more so the dominance of the world through force. And if he couldn't, nobody else need try it now or ever, certainly not the blundering hun, who knows nothing but force. If Wm. J. Hoze. had read history at all he would have known what he was up against when he provoked the Anglo-Saxon peoples, a race that never quits, never gives up, never knows when it is whipped—and so prevents the other fellow ever finding it out.

Now, let's stop the foolish adulation of everything German, and understand that people for what it is. Turn over toward the front of the magazine and read the address of President Seigfried, of the Miami Valley Society, down at Dayton. If you read it once you will read it again. I have read it at least four times and expect to read it over and over. The one point that makes it so convincingly interesting is that the author, with German blood in his own veins, sees in the modern Teuton a thing so vile that the very name "German" smells to high heaven. Read particularly the little poem with which his address closes.

Do not ever lose sight of the fact that, while the war is over, so far as the organized German government is concerned, there are still many grave questions to work out that never can be settled until they are settled right; and, remember this also: *no question ever has been or ever can be settled right except in the full recognition of the fact that to the individual belongs all the rights that exist;* and that states and governments exist only for the *good of the individual.* The individual man is a natural fact: governments are merely artificial limitations of the natural rights of natural men. These limitations must be self-imposed, self-executed, or they amount to nothing. Laws the mass of human minds do not approve cannot be executed. In a democracy such as ours the supreme power is not the congress, nor the President, nor any other constituted authority; it is *public opinion.* Every member of a democracy gives up part of his natural rights and privileges in order that he may gain something that is to him more valuable than those abandoned. "The greatest good to the greatest number—and every good to every man of good will." It's about time that the world understood that angels' message to mean not "Peace on earth, to all men good will," but "Peace on earth to men of good will." And that is the only kind of men that ever have or ever can have peace Those of ill-will must suffer the fate of Germany, today struggling against the forces of devolution and disintegration, and, apparently, making a losing fight.

"Trench Mouth" is simply Vincent's Angina due to lack of care and attention while under lengthened exposure. Latent abscesses spring into furious activity under trench conditions. Neuralgias are common.

The old theory of equity that an oral agreement was as good as a written contract if proven has been confirmed by an Iowa court that gave Dr. N. J. Bates, of Bedford, a verdict for half of his foster parents' estate on the ground that it had been promised to him orally upon conditions that he fulfilled by remaining with them until their death. Other heirs contested his claim, but the court confirmed it.

Tell your patients at every opportunity that they simply must see to it that the teeth of their children are placed and kept in first-class condition. Tell them that not only the health and proper growth and development of the body depends upon it, but that the mental sanity of the child stands or falls by it.

Dentists with the A. E. F. were kept busy night and day. They never had time to look at the clock, and whistles didn't blow over there. A toothache was a worse affliction to an American soldier than a wound. He would stand the other with a smile and a grunt—but an aching tooth! Hully Gee!

The embargo on precious metals has been lifted, so far as dentists are concerned.

New Orleans dentists pledged themselves to work on emergency cases in their own practice only, and to devote as much time as possible to public work during the recent "Flu" epidemic in that city.

Dr. Edith Manderbach of St. Louis has been called to Sioux City, Iowa, and placed in charge of the municipal dental clinic.

We must not relax our efforts for a moment. There is still much to do to make the world Safe for Democracy. Autocracy has been wiped off the slate; but there still is another still worse, still more insidious enemy to be reckoned with, and that is Anarchy—Bolshevikism, I.W.W.ism. The next lesson that America must teach the world very likely is, that liberty is not license, and that the two have no relation to each other. You and I have the most complete right to do anything we please so long as we do not interfere with the right of every other fellow to do as he pleases, and he has the most perfect right to do as he pleases so long and so far as he does not interfere with the actual rights of others.

Many American dentists now in France are said to be planning to remain on that side, where there is a tremendous demand for American dentists and dentistry. Nowhere in the world are teeth cared for as in this country. It is no unusual sight to see well-dressed English women, evidently well-to-do and of good station, who have one or several anterior teeth missing. It seems to be the idea of the English dentist to get rid of an ache by removing the tooth. The French have much better teeth than the English. A Frenchman would rather go hungry than bolt his meal. He insists upon a full hour for dining.

French Children are Brave in Dentist's Chair

The fortitude of French children while having their teeth inspected by dentists of the American Red Cross has aroused the admiration of those engaged in the work. Thousands of children are among the "répatriés" reaching the Red Cross station on the Swiss frontier from the invaded regions of France. The mouths and teeth of young and old are thoroughly examined to prevent the bringing into France of diseases contracted behind the German lines.

"We find the teeth of the children in a most deplorable condition," said Dr. Fred A. Bize, of Tampa, Florida, "but despite the fact that a great majority of them have never had the services of a dentist they let us make the inspection without whimpering. No matter how long the examination takes there is no word of complaint. Although the dentist is a big man from a foreign country who does all sorts of things to their mouths they never cry. Their stoic-like attitude is typical of the great courage of France."

The fine teeth of American soldiers have attracted notice and press comment in both France and England.

Join the Red Cross

University of Rochester Dispensary

Rochester, N. Y., Oct. 17.—The first year of the Dental Dispensary has closed and the annual report of its work performed has been completed by the director, Dr. Harvey J. Burkhart, and "amply demonstrates the wisdom of the founder, George Eastman, in providing for the dental needs of the children of this city."

The report shows that sixty-one hundred and forty-three children have received treatment at the institution. This is about one-eighth of the school population of the city of Rochester. The record is a remarkable one for the first year, when it is remembered that the work here, in order to bring the children to the dispensary, was necessarily of an educational nature, to acquaint the parents and children with its value and necessity. Some really remarkable results have been obtained in the restoration of the jaws and faces of children, who otherwise could not have had the work done.

"It will be noted," the report continues, "that a very large percentage of the children have paid the nominal fee of five cents a visit; the object of making the charge being to make the child feel that he is not an object of charity, and that service rendered is worth while. There are, at the present time, about eighty children receiving orthodontic treatment, which means the straightening of crooked teeth, who could not afford to pay for having this necessary and particular work done by a private practitioner.

"The work being done in this institution is receiving the cordial support of the school authorities and teachers, and is being increasingly appreciated by the patrons of the institution. Within a short time the rules for treatment have been changed by the board of directors so the present rules are:

"A family of two may have an income of not more than $15; a family of three not more than $20; a family of four not more than $24 a week, and a family of more than four not more than $5 a week each.

"It is the hope of Mr. Eastman and the board of directors that parents will see to it that all coming within the rules of the dispensary will promptly avail themselves of its benefits. This not only applies to children of school age, but is intended especially for babies, as soon as their first teeth appear, so that their teeth may be cared for and preserved, in order that the permanent set may be greatly improved.

"The activities of the management of the Dental Dispensary have not been confined to the work in the institution. The report shows that a lecturer from the dispensary gave talks to seventy-one thousand, nine hundred and forty two children in the public and parochial schools and public institutions during the last year. The licensed dental operators, graduate dental hygienists and members of the hygienists' school during the year cleaned the teeth of seventy-five thousand, five hundred and twenty-four children in the public and parochial schools and other institutions, in two visits to those various schools and institutions. The far reaching benefit and effect of this work is beginning to make itself manifest in the better appearance and health and comfort of the children.

"The city of Rochester appropriates for the work in the schools the sum of $20,000 each year. No other city in the world has taken the interest in this school welfare work that has been exhibited by the municipal authorities in this city."

X RAY A complete course of private instruction in DENTAL ROENTGENOLOGY is offered. Special attention to technic. Address

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In the treatment of suppurative lesions of the gums, wherein stimulating restorative antiseptic influence is indicated, prescribe

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For cleansing and purifying the oral cavity before and after operations on the teeth, a cooling, refreshing spray, wash or gargle is provided by

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As an adjunct to the dental toilet of your patients; as a prophylactic tooth and mouth wash, for daily use, there is nothing superior to

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Booklet "The Teeth and Their Care" emphasizes the importance of frequent consultation with the dentist, and contains useful information for patients; 200 copies, imprinted with professional card, furnished gratuitously.

Dental Examination Blank combining chart and Notice to Parents, suitable for dentists doing clinical work among school children, also supplied without cost. Dentist's name and address printed thereon.

Lambert Pharmacal Company

Twenty-first and Locust Streets **St. Louis, Mo., U. S. A.**

New York College Expands

The New York College of Dentistry at 205 East Twenty-third Street has arranged for an important extension of its activities through the purchase of the former home of the Manhattan Trade School for Girls at 209 to 213 East Twenty-third Street, adjoining. The school is six stories—the same height as the college building—and occupies a plot 73.2x100. With it the college almost trebles its present accommodations, getting control of a plot that fronts one hundred and twenty-two feet on Twenty-third Street, adjoining the northeast corner of Third Avenue, which is occupied by the New York Opthalmic Hospital.

The End of German Bluster

"How hath the Mighty Fallen"—from a dream of world conquest and domination a few short months ago the proud German government is upon its knees begging mercy from its conquerors on the west front and in Italy, while within the confines of its once far reaching borders civil strife, revolution and even anarchy are near the boiling point.

Today Germany stands a pitiable but unpitied object shorn of its strength, its borders contracted until all that remains of the great Empire that went to war in 1914 is strictly German—the Germany and the Germans that will be made to pay in years of toil for the havoc they wrought. For it seems well understood that when the time to discuss the terms of peace arrives the Allies will not deviate one jot or one tittle from exacting the full measure of repair and repayment for all wanton destruction, on land and on sea.

With his stage all set and banners flying he proposed to enter Paris at once, but the Italians drove him back at Rheims, the Americans drove him back at Chateau Thierry, and then began the series of retreats and defeats on every front in every land that has forever banished the Hun from his place as a ruling power and made the world safe for liberty loving people. All that remains to be done is for the Allies to set the limits of his territory henceforth and for the dastardly crimes he has committed since 1914. The world has stood aghast at the horror of his atrocities. Never among the most savage and barbarous races has been seen such cruelty and utter depravity, such utter disregard of human decencies, such absolute lack of moral rectitude, such dearth of sentiment or mercy. Churches, cathedrals and sacred places wrecked, destroyed and defiled. Worse than the Turks, even, in that the Turks turned the places of worship that fell into their hands into use for their own religionists. Children and babies murdered in cold blood, young boys maimed and carried into slavery. Women and girls carried captive into Germany to meet fates worse than death. Wounded prisoners of war tortured with more fiendish deviltry than could be devised by the Indians, hospitals bombed, non-combatants left in cities abandoned in their retreat no later than this week destroyed by gas shells thrown by the Germans when a safe distance away. Towns without number, burned, trees, even whole forests levelled to the earth in the Hun frenzy at having to retreat and give up the land they had hoped to dominate. In all the territory wrested in the last month both on the French front and in Italy is found evidences indisputable of wanton devastation and cruelty that had no shadow of excuse in military necessity. Germany shall now reap what she has sown. Firmly shall Justice in full be meted out to her and this Justice shall be alike Just to Germany and the Germans, and to the Allies and their devastated countries.—*It. Arm. News Bureau.*

DEATHS

At Cleveland, October 17, of pneumonia, superinduced by Spanish influenza, First Lieut. George A. Roe, D. D. S., aged 25. He was widely known as "Tubby" Roe, famous on the foot-ball field during school and college days.

At Shaw, Mass., October 17, Dr. J. A. DeLoach, formerly of Vicksburg.

At Lexington, Ky., October 16, Major M. M. Postle, D.D.S., chief of Dental Service, Camp Taylor, formerly of the faculty of Northwestern University. Influenza.

At Los Angeles, Cal., October 15, Dr. Frank Snedecor, formerly of Birmingham, Ala.

At Bryn Mawr Hospital, Philadelphia, Dr. T. F. Glenn, formerly of New Orleans, aged 40. For many years Dr. Glenn was resident manager of the Southern headquarters of The S. S. White Dental Mfg. Co., stationed at New Orleans.

Classified Advertisements under this heading, $2.00 each for 60 words or less; additional space 2 cents per word, single insertion; three insertions or more, special rate on application.

FOR SALE—A modern office in the downtown section of Cleveland. An established practice among the best Jewish people. Address 1260C, The Ransom & Randolph Co., Cleveland, O.

LABORATORY FOR SALE—Going concern located in live Pacific Coast city. Inventory price. Reason for selling, entering other business. Address 1250P, Care of The Summary.

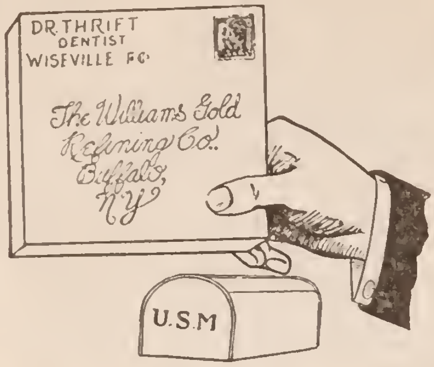
FOR SALE—One Electro Dental Engine, direct current, in excellent condition. Has been used short time. Price $150.00. Address 1240C, care of The Summary.

FOR SALE—An ethical dental practice in Seattle, Washington, consisting of two complete modern dental outfits, laboratory and reception room. Two operators busy all the time. Owner busy with other line. $5,000.00 takes it. Address 1230P, care of The Summary.

FOR SALE—Dental Laboratory; good paying proposition, doing from $1,200.00 to $1,500.00 per month, excellently equipped. Business will stand thorough investigation. Reason for selling, ill health. Address Box 1220P, care of The Summary.

WANTED—One competent recent dental graduate, to become associate for large practice in Norfolk, Va. Address 1240C, care of The Summary.

WANTED—Operators in the Free Dental Clinics in Cincinnati. Salary, $60 per month for half time; $120 per month for full time. Apply to the President, Dr. S. J. Rauh, 54 Harrison Bldg., Cincinnati, Ohio. 1210P



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